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PETROLEUM WEEK

A McGRAW-HILL PUBLICATION

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ANN ARBOR MICH

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In San Juan County, New Mexico and *Noble County, Oklahoma,* Dowell engineers have reported the successful use of a new technique—using Abrasijet* for perforating, a retrievable bridge plug, and multiple fracturing in a single trip of the tubing to cut the cost of fracturing several zones. *Important savings have resulted.*

In Coshocton County, Ohio, Henderson County, Kentucky, and in other areas, the successful use of Rockshock* to initiate fractures has been reported. This Dowell-developed service, using *implosion* capsules, has made possible the successful fracturing of dense, tight formations that previously could not be fractured.

From Howard County, West Texas, San Juan County, New Mexico, and many other areas come reports about Slick Water. This Dowell-developed agent greatly reduces friction. For the first time, *it is practical to perform relatively high-injection-rate fracturing down tubing.*

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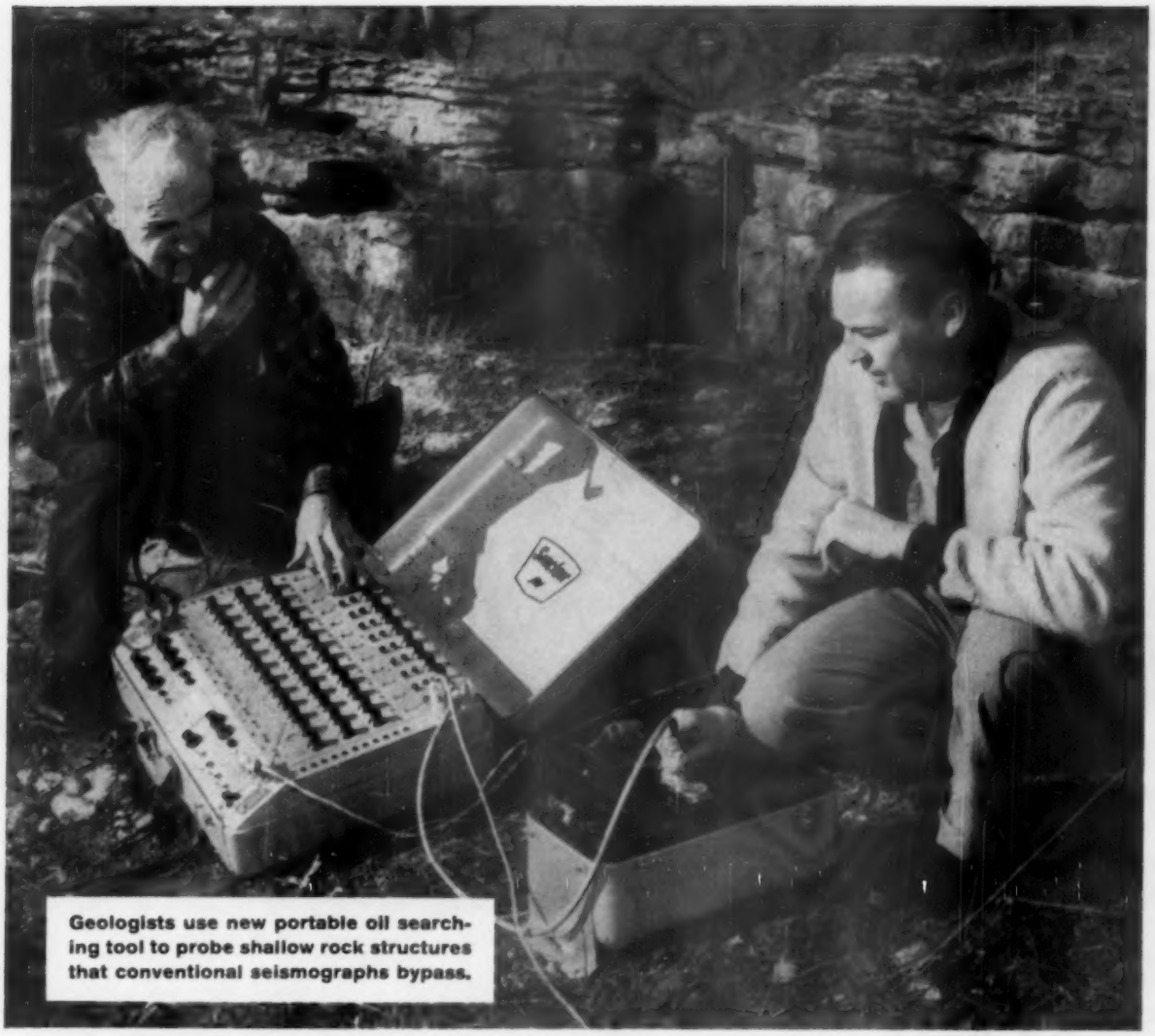

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One experiment being tested is the unique, portable seismograph above. Developed by Sinclair Research Laboratories, Inc., this device quickly probes subsurface areas bypassed by conventional instruments.

Sinclair believes that from research will come better ways of obtaining the low-cost petroleum energy *on which this nation thrives—and depends.*

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INSIDE Slant

CONSISTENCY WOULD HELP

Most of the present ills of the petroleum industry can easily be cured by consistency. Or to be blunt, be honest with yourself.

There's no better example of this inconsistency than the refinery runs situation. Company after company claimed they had reduced refinery runs during 1959. But when it came to revealing company operations to their stockholders, it was a different story. Officials pointed with pride to their record runs last year.

And don't forget the most bitter critics of the current imports plan. Those who scream the loudest against inland refiners obtaining quotas have inland plants of their own. Thus, they're able to transfer their quotas to their coastal plants.

Then, too, other critics of the traffic in quotas are the largest buyers of them. If they want the traffic stopped, then they should quit buying quotas.

Also, there are the companies that have complained loudly to Washington for a boost in resid quotas, then bragged to their stockholders on how much they've reduced their output of resid.

Consistency certainly hasn't been a virtue.

LeRoy Menzing

WE'LL ADMIT

there are many claims about many wellhead hook-ups and components. But if you want to take the puzzle out of your production equipment, ask the O-C-T representative nearest you about "The Standard." It is simply a combination of an O-C-T Casing Head, O-C-T Tubing Head, master valve of your choice, and O-C-T flow control.

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60-Second Summary / WHAT'S HAPPENING IN OIL

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It's going to be a tough grind for the June crop of new geologists to land jobs. The job market is the tightest it has been in 20 years. . . . p. 21

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Tighter rules for the Federal Power Commission may be the chief result of the House hearings. Some FPC members say that "proper" industry contact needs to be defined. . . . p. 11

•

Venezuela's biggest producer, Creole Petroleum, is bucking stiffer competition with more price discounts. Two-thirds of its output is affected. . . . p. 55

•

Two more Canadian pipeline companies are studying the possibility of moving surplus natural gas liquids into U.S. markets. This means a three-way contest is shaping up to handle the 60,000 b/d surplus. . . . p. 52

•

The bigger the refinery, the more delicate are the startup and shutdown procedures. That's the consensus of a group of engineers who discussed techniques at API's midyear refining meeting. . . . p. 45

•

Control of output by oil exporting nations could correct oversupply, according to Saudi Arabia's Tariki and Venezuela's Perez. They charged that international oil companies are responsible for production in excess of the world demand. . . . p. 12

•

The industry's campaign to halt the slump in lube oil sales is making headway. It's a positive program that's showing signs of progress on all fronts. . . . p. 60

•

Egypt is hoping to cash in on the interest in North African oil. The United Arab Republic is seeking bids for Egypt's part of the Sahara desert. . . . p. 54

•

There may be some changes in military requirements for diesel engine fuel. Under consideration is a mixture of gasoline and distillate, instead of distillate alone. . . . p. 46

•

Prospects for the Virginia Hills field in Alberta seem to have brightened considerably. The field now has more than 25 producers. . . . p. 25

•

Waste water has always been a problem for refiners, but progress is being made in treatment and disposal methods. Three new installations were described in detail last week. . . . p. 62

Up to the Minute / SIGNIFICANT LATE NEWS

AT-A-GLANCE PETROLEUM WEEK Copyright

May 20, 1960

Texas producers will have another eight-day schedule in June for a total of 55 days since January, the least ever for a first half. The producing days allowed in the first six months are 13 less than in 1959 and one below 1958. The last half of 1959 also had a 55-day schedule.

The initial Texas allowable for June will average 2,643,516 b/d, an increase of 47,108 b/d from the eight-day schedule in May, which has one more calendar day. Six major buyers requested nine days for June, three asked for eight days, and three asked for seven days. Sinclair Crude Oil, Indiana Oil Purchasing, and Phillips reported they would have crude to sell on a seven-day schedule. The next statewide hearing has been postponed to June 20.

•

Sunray Mid-Continent Oil Co. has made a sextuple gas completion in Southwest Texas, barely a month after Sinclair Oil & Gas Co. made the first quintuple completion off the coast of Louisiana. Sunray's No. 6 J. A. Graves, in Jackson County's North Laward field, flowed 2,770,000 cf/d from six separate gas zones at depths ranging from 4,683 ft. to 6,634 ft.

•

Another big petrochemical operation is in the making. The Borden Co. and U. S. Rubber Co. are forming Monochem, Inc., to construct a plant with an initial annual capacity of 80-million lb. of acetylene and 150-million lb. of vinyl chloride monomer. It'll use natural gas or a low-flash-point liquid as a starting point, and will probably be located on the Louisiana or Texas coast.

•

The Texas Railroad Commission will review MERs in all prorated fields next month at its hearing to consider prorating future waterfloods and pressure maintenance projects. The commission this week said it was broadening the scope of the June 16th hearing to include "considering whether the most efficient rates in existing and future prorated fields should be limited so as not to exceed the allowables established by the amended 1947 yardstick."

•

Attorney Thomas G. Corcoran declared that he had every right to discuss a pending gas case with Federal Power Commissioners. He told a House subcommittee (page 11) that his boss, Tennessee Gas Transmission's chairman Gardiner Symonds, later told Corcoran that he had been "soft" in his ex-parte conversations, and should have told FPC members that TGT's subsidiary, Midwestern, would not build its line with the proposed 6.25% rate of return.

•

The National Oil Jobbers Council backed down this week on its threat to take its problems to the Federal Trade Commission. The council had threatened to do so unless the American Petroleum Institute made a study of large companies' marketing profits—which it declined to do.

AMMONIA

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- 1,113,000 TONS PER YEAR

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DEPT/Opinions

Views Tha-

"It is ironic that [some] American businessmen are so ready to accept the yoke of government dependency and control. It matters not to them that they are abandoning the historic principles of private enterprise, so long as government shelters them from the rigors of competition and keeps them in business at taxpayers' expense.

"This is a potentially tragic course for American business to follow. Unless we disavow it, we will find ourselves shackled by a planned economy that has been inflicted on us not by some starry-eyed economic dreamers but by businessmen themselves."

—T. S. PETERSEN
President
Standard Oil of California

. . . and Letters

Dear Sir:

Your account of Opinion Research Corp.'s views regarding pleasure driving, "Is Pleasure Driving on the Way Out?" [PW—Apr.29'60,p38] was somewhat out of focus. Much of what was reported as conclusive was in fact offered as hypotheses and inference based on our research into consumer behavior patterns. The point we were trying to make is that there are many questions about pleasure driving and its future that obviously call for research to provide definite answers. At the moment we certainly do not have those answers. We wish we did.

ALVIN SCHWARTZ
Director of public relations
Opinion Research Corp.

Dear Sir:

. . . even if it were possible to effectively stimulate gasoline demand by stressing the family car as a means of recreation, the effect would only be short-term. Why? Because driving for driving's sake is no longer a pleasure.

I do believe, however, that there is some merit in this type of promotion, particularly when approached from a slightly different angle. That is—to promote driving for educational purposes. A concerted campaign to get families out on weekends including one overnight stay, for visits to nearby communities historical spots, points of interest, etc., all designed along the lines of an educational effort, might be the answer. A "Get To Know Your State Better" program is adaptable to all income levels and of educational interest to the oldsters as well as the youngsters.

Make News . . .

Push for once or twice a month trips to points no further than 200 or possibly 300 mi. distant, with an overnight stay, relaxed viewing of selected areas, and short return trips allowing time to settle down the next evening at home. This promotes family togetherness as well as learning togetherness. It's fun, even with a little uncomfortable driving, and, best of all, its doesn't cost much. With a lot of families doing it, extra gallonage can add up.

FRED H. HEIERDING
Accounting Dept.
Standard Oil Co. (Ohio)

Dear Sir:

. . . the decline in the use of the family car for pleasure driving is undoubtedly true. This situation is the result of industry's failure to sell the consumer on "going places" and taking advantage of the new recreational activities available.

That's why API has set up its "Stimulate Gasoline Demand" committee. This committee is presently developing an imaginative marketing program to reverse this trend. While an advertising campaign might be employed at a later date, there is a misconception that the committee's efforts will be confined to advertising. There is a great potential for productive work by the committee even if it should never undertake any advertising.

JAMES G. BENNETT
Division of Marketing
American Petroleum Institute

Dear Sir:

I should like to take this means of expressing to you my personal appreciation, as well as that of the general committee of the Division of Marketing of the American Petroleum Institute, for the very thoughtful and timely editorial "Worthy Projects Deserve Support" [PW—Apr.29'60,p56]. I am sure that this will help, and it is the type of editorial that will focus attention on the important things we are trying to do in behalf of the industry. Thank you.

CHARLES J. GUZZO
Senior vice-president
Gulf Oil Corp.

PETROLEUM WEEK *will publish reader comments each week. Address letters to LeRoy Menzing, Editor,* PETROLEUM WEEK, *330 W. 42nd St., New York 36, N. Y.*

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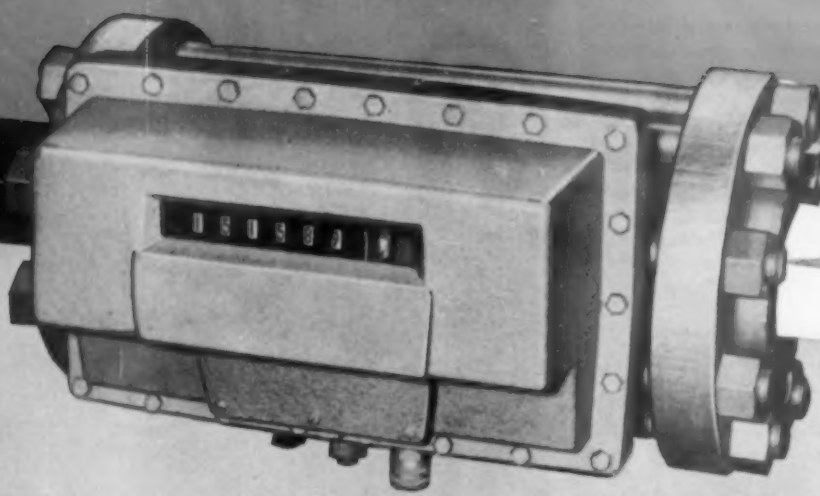

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House Hearings' Aim Is Revised Procedure Rules

House investigators tried this week to pin a tag of industry influence on the Federal Power Commission, but FPC members flatly denied any improper effect on natural gas decisions.

The House Subcommittee on Legislative Oversight had before it dozens of names and dates involving industry contacts with commissioners. What the subcommittee did not have was any evidence that the contacts affected the outcome of FPC cases.

The House investigators were weaving a web of circumstantial evidence which might yet be sufficient to cause a crackdown on FPC.

For regardless of what the investigations may prove in connection with industry contacts, there is little doubt but that efforts will be made in Congress—and possibly within FPC—to tighten rules of procedure.

The commissioners have argued that there are no directives or laws prohibiting contacts with industry representatives. They also have pointed out that such contacts are inevitable in the normal course of business.

Vice-Chairman Arthur Kline, questioned for an entire day, said his contacts with industry representatives included setting golf dates and talking about boy scouts.

The subcommittee staff obtained Kline's engagement notebook and ticked off scores of "private contacts" from 1958 to 1960. At one point, Rep. John Moss (D., Calif.) questioned Kline about a name which turned out to be that of a PETROLEUM WEEK reporter on a news assignment.

Kline branded as improper, however, the contact made with him by Thomas G. Corcoran, lawyer-lobbyist for Tennessee Gas Transmission Co.

It was Corcoran's visits and telephone calls to FPC members while the case of the TGT-owned Midwestern Gas Transmission Co. was pending that initiated the House investigation.

Kline said the matter of a rate of return for Midwestern arose "in such a way that it was impossible to stop the conversation."

Kline explained that Corcoran told him Tennessee had decided to divest itself of Midwestern ownership, and gave two reasons: that Tennessee was getting so big it feared antitrust action, and that the company's rate cases were becoming too complex.

But, Kline told the subcommittee, Corcoran did not mention specifically Midwestern's rate of return, which was later argued by the commission and left open pending further action.

Kline added: "My original view that Midwestern is entitled to only 6.25% rate of return remains unchanged." He said he agreed to an open-end rate only because a commission majority opposed him.

Commissioner William R. Connole vigorously defended the FPC practice of meeting with industry men.

Connole, who will be replaced on the commission next month, did not grind any axes against the gas industry as some onlookers thought he might do.

Instead, he insisted that FPC's doors should be open to the public —consumer, pipeliner, and producer alike—and recommended steps for improvement of regulatory agencies.

FPC Vice-Chairman Arthur Kline

Connole urged that federal money be used for commission business and inspection trips to avoid reliance on industry transportation.

He said there should be a law defining in detail which industry contacts with a commission would be proper and which improper.

Other recommendations were that agencies keep in close contact with Congress through frequent hearings, that FPC retain its present functions, and that some formula be devised to keep "able men of integrity" on federal regulatory agencies.

Connole told of his contact with Corcoran and said he had already made up his mind on the case and did not change his ideas. He said Corcoran's visit was proper, but agreed that what Corcoran told Kline should be considered improper.

Commissioner Frederick Stueck said he was urged to back a higher rate of return for Midwestern Gas Transmission by the company's president, N. W. Freeman.

But Stueck maintained that he was not influenced in his decision on the Midwestern case.

None of the other commissioners drew as much criticism from committee members as did Chairman Jerome Kuykendall.

Evidently holding the chairman responsible for commission actions and practices, several members castigated Kuykendall for his contacts with Corcoran and other industry representatives.

PETROLEUM WEEK:

Quicker Delivery To Europe at Lower Rates

Effective with its June 3 issue, Petroleum Week will offer improved air mail service to its readers in Europe.

On that date, Petroleum Week will be delivered by air mail to those subscribers in Europe who desire such service at a cost one-fourth of existing rates.

Plans call for the expansion of the reduced-rate air mail service to other parts of the world as rapidly as arrangements can be made.

Tariki & Perez: Oil Nations Could End

The oil chiefs of Saudi Arabia and Venezuela charged last week that international oil companies—not governments of producing nations—are to blame for oversupply of crude.

The two officials—Abdullah Tariki, director general of Saudi Arabia's Office of Petroleum & Minerals, and Dr. Juan Perez Alfonzo, Venezuela's Oil Minister—met in Caracas to discuss proposals for prorating petroleum production in the major exporting nations to world demand.

In a joint conference, Tariki was the most outspoken of the two officials.

"If there is an oversupply," Tariki said, "it is not the fault of the governments of producing countries. It's easy for companies to keep production in line with demand."

And Perez added that Middle East governments want to "collaborate" in controlling production, but that at present not all of them have the means of doing so, since it is the oil companies that control sales.

Both officials offered as a solution to oversupply a compact of major exporting nations to place control of production in government hands.

Perez said that Venezuela and Saudi Arabia have no "official accord" on a world proration agreement, but that Venezuela is ready to enter into a proration compact.

Tariki and Perez left no doubt that the main problem of creating such a pact is to get all the Middle East producing nations—including Saudi Arabia—to agree.

"We are now working with other producing countries in the Middle East," Tariki said, "hoping that all producing countries will get together to formulate a policy to regulate production."

Perez declared that the "economic condition of producing countries obligates them to defend oil prices." Because of their own economic condition, they should understand the "necessity of a proration agreement."

Tariki added: "We are confident that everybody will join in the plan, once they understand the problem . . . At present, the companies are prorating production in the Middle East. It is necessary to educate the countries to the fact that they can't increase production as they wish—it is the companies that increase or decrease production."

One move to create interest in a world proration plan is an invitation to the Shah of Iran and to the director of the Arab League's petroleum department to visit Venezuela.

Perez said the Shah, now touring Europe had "indicated an interest in visiting Venezuela."

A joint statement by Perez and Tariki announcing the invitations described the Arab League's petroleum department director, Mohammed Salman, as "one of the most outstanding spokesmen of the compact" to prorate production to market demand.

But there are some doubts among international petroleum observers that Iran and Iraq would be in accord with the proration plan first mentioned by Perez, and more recently outlined by Tariki earlier this month at the annual meeting of the Texas Independent Producers & Royalty Owners Assn.

Oil Man's Album

More Romance—But More Waste

The petroleum industry has changed a lot for the better in the 40 years since this picture, of equipment moving through the Burkburnett field of North Texas, was made. Such scenes as this led to the adoption of conservation statutes. They brought more orderly—though possibly less romantic—development of oil resources.

(No. 40 in a Petroleum Week series.)

Purchaser's Gas

Field prices of natural gas paid by one substantial purchaser—Northern Natural Gas Co.—have climbed 48% in the past seven years.

The company reports that the average price last year for all fields where it buys—primarily in Texas, Oklahoma, New Mexico, and Kansas—was 13.5¢ per Mcf., up 1¢ from a year ago, and 4.4¢ above 1953.

And Northern Natural's volume of gas purchased and produced climbed 89% from 1953 to a total of 484.9-billion cu. ft. last year. Of that total, 452.8-billion cu. ft. consisted of purchased gas.

The sharpest increase in price came in several minor fields where average prices paid by the company jumped 147% since 1953 to 15.8¢ per Mcf. last year.

Another substantial increase came in several Permian Basin fields, where prices climbed 58% from 9¢ per Mcf. in 1954, when the company started purchases in the area, to 14.2¢ in 1959.

Crude Surplus

The proposal, yet to be spelled out in great detail, would, according to Tariki, prorate production in the major oil exporting nations to demand, using reserves as the primary basis for proration.

The plan, Tariki added, would make provisions for future discoveries, and would include a "correction factor" for the current market positions of the participants.

The Saudi oil chief also suggested last week that Middle East oil nations should raise taxes on oil companies to boost income without increasing production.

"Middle East countries," said Tariki, "should not be worrying about how much they produce, but about the return on oil investment and their share of that return."

He argued that the return to oil companies on their investments in the Middle East "is 60%, compared with 18% in Venezuela."

Saudi Arabia, according to Tariki, is following in the steps of Venezuela. "We got the 50-50 formula from Venezuela. Venezuela has now increased its participation to 65%. Now the only thing is to convince Middle Eastern countries that they should increase their participation."

Costs Climb 48%

Price paid in the Hugoton field in Kansas and Oklahoma also showed a sizeable increase—52%. It climbed from 9¢ per Mcf. in 1953 to 13.7¢ last year.

The highest price Northern Natural now pays—18.7¢ per Mcf.—is in the Camrick field in the Anadarko Basin.

Northern Natural started purchases in the field in 1957 at a price of 18.5¢ per Mcf. The price inched up to 18.8¢ the following year, then slipped back to 18.7¢.

The lowest price the company pays —10¢ per Mcf.—is in Lea County, N.M. The company started purchases there in 1954 at 9.5¢ per Mcf., and held that price until last year when it climbed to 10¢ per Mcf.

In one area, the Spraberry Trend of West Texas, the price paid for gas has declined substantially in the past seven years—from 15¢ per Mcf. in 1953 to 11.1¢ last year.

Northern Natural's prices in that area dipped to 10¢ per Mcf. in 1954, then slowly inched up to 11.1¢.

Stripper Wells Boost Output

Better recovery techniques have boosted stripper production sharply, with a resultant reduction in reserves in stripper fields.

The latest national stripper well survey just completed by the Interstate Oil Compact Commission shows production reached an all-time high of 511,842,000 bbl. in 1958. This represented a 37-million-bbl. hike over 1957, and a 26-million-bbl. increase over the previous record, set in 1956.

At the same time, the new survey shows that primary and secondary reserves in stripper fields dropped 1.2-billion bbl. in 1958 to a total of 6,879,300,000 bbl. as of Jan. 1, 1959. This was the lowest level for reserves since Jan. 1, 1952, when the total was 6,856,000,000 bbl. The drop also ended a steady six-year increase in stripper field reserves.

Sharply increased production together with declining reserves indicate that the day may not be too far away when the number of stripper wells will start to decline.

Although the number of wells climbed to a new high in 1958—373,870—the increase of 1,351 wells was small compared to recent years—2,030 net additional wells in 1957, 12,558 in 1956, and 17,655 in 1955.

The survey also showed: (1) that average production per stripper well in 1958 inched up 0.25 b/d from 1957, to 3.75 b/d; and (2) that there were more abandonments in 1958 (9,788 wells) than in 1957 (8,651 wells).

It is estimated that 11.2% of the primary reserves of the U.S. are in stripper fields.

And it is estimated that these fields can produce approximately 11% of total U.S. reserves under secondary recovery methods.

The breakdown by states shows a wide range in average output. Louisiana's stripper wells are the most productive, averaging 12.19 b/d. In second place are Mississippi's stripper wells, with an average of 11.14 b/d.

Five states averaged less than 1 b/d in 1958. Pennsylvania was lowest with 0.27 b/d.

State	No. of Stripper Wells	Production From Strippers (000 bbl.)	Average Production Per Well (b/d)	Secondary Reserves (000 bbl.)	Total Primary and Secondary (000 bbl.)
Ark.	4,258	8,066	5.19	44,980	86,102
Calif.	20,718	61,913	8.19	475,115	537,889
Colo.	314	951	8.30	.....	10,784
Ill.	28,137	79,778	7.77	.....	417,097
Ind.	4,349	8,430	5.31	39,500	85,635
Kan.	32,555	50,680	4.27	85,550	457,320
Ky.	13,388	13,446	2.75	55,000	105,000
La.	2,792	12,424	12.19	69,800	168,610
Mich.	3,607	9,297	7.06	102,703	164,065
Miss.	223	907	11.14	.....	7,210
Mo.	133	83	1.71	.....	650
Mont.	3,106	4,013	3.54	107,275	143,755
Neb.	48	138	7.87	1,750	2,674
N.M.	4,340	5,860	3.70	37,750	87,690
N.Y.	16,000	1,700	.29	53,000	132,000
N.D.	69	368	1.46	5,410	5,961
Ohio	17,073	6,525	1.05	5,500	73,141
Okla.	62,905	86,273	3.76	724,130	1,383,665
Pa.	66,054	6,485	.27	386,007	506,025
Tenn.	34	7	.52	.....	.....
Tex.	77,920	145,502	5.12	966,045	2,105,720
N. Tex.	26,929	40,994	4.17	373,050	698,530
W.C. Tex.	11,000	14,715	3.67	103,900	209,735
Other	39,991	89,793	6.15	489,095	1,197,455
Utah	13	11	2.40	.....	.....
Va.	13	4	.94	.....	.....
W. Va.	12,808	2,187	.47	50,000	87,458
Wyo.	3,013	6,794	6.18	235,500	310,779
Misc.	.....	.....	.....	.....	160
Total	**373,870**	**511,842**	**3.75**	**3,445,015**	**6,879,300**

Demand outlook is good, but . . .

California Faces Invasion

California's short-term oil outlook is promising, but competitive prices, peripheral crudes, and natural gas may alter it materially.

That, in essence, is the prospect for the next five years, according to Howard G. Vesper, president of Standard Oil Co. of California, Western Operations, Inc.

His analysis, presented to the American Petroleum Institute's Pacific Coast production meeting last week, emphasized the significant changes that have taken place.

A steady growth in oil demand is anticipated but, West Coast producers were told, neither supplies nor prices are insulated any longer by traditional barriers of the past.

"Whether we like it or not," Vesper said, "our natural protection against the competition of outside oil no longer exists. If California oil is to compete successfully . . . it will have to be priced competitively."

And, he went on, it is a certainty that surplus crudes from the Rockies, Texas, New Mexico, and Canada will perpetually influence California prices and competition.

Vesper discounted foreign oil as a "flexible element" in the California supply picture.

Natural gas poses a major threat to California's crude production outlook, according to Vesper. Fuel oil demand should rise moderately in the next five years, but if proposed gas projects materialize and available gas exceeds firm requirements, gas could depress fuel oil demand by as much as 100,000 b/d.

If all goes well, however, annual increases of 5% in the consumption of gasoline and other motive-power fuels, and 3% in fuel oils, can be anticipated.

Drilling Forecast Employs 'New Approach'

An extrapolation, based on a new approach indicates that there may not be as many holes drilled in 1960 as industry experts had anticipated.

In this particular case, however, the formula for the forecast may generate more interest among oil men than the forecast itself.

This is because the new extrapolation technique holds promise of being an easier and faster method to compute and predict drilling activity.

The formula for the extrapolation was developed and copyrighted by the economics division of Lionel D. Edie & Co., Inc., a New York investment and financial firm, for its economics and market planning service clients.

It is called the "First Few Months" test, and is based on weighted data for two, three, or four months. The key is the special seasonal adjustment that Edie economists developed to allow for variations in drilling during the year.

To check its accuracy, projections were made up on an annual basis for 1947 through 1959, and compared with actual data.

The tabulations indicated an average plus or minus deviation of 4.8% for a two-month base; 3.6% for a three-month base; and 3.4% for a four-month base.

An Edie spokesman says the formula represents a "step forward" in forecasting drilling.

The extrapolation for 1960, based on the first three months, indicates that 46,484 tests will be drilled this year, compared with industry expectations of 48,000 to 50,000.

The indicated level would represent a drop of 8.7% from 1959.

If the projection proves to be correct, it would mean that drilling will have slumped to its lowest point since the early '50s.

How the Extrapolations Compare with Actual Data

Year	Seasonally Adjusted Annual Rates Jan.	Feb.	Mar.	Apr.	Averages of the First 2 Mos.	3 Mos.	4 Mos.	Actual Annual Data	Percentage Differences From Annual Data 2 Mos.	3 Mos.	4 Mos.
1947	31,188	32,916	31,584	30,228	32,052	31,896	31,479	33,122	—3.2%	—3.7%	—5.0%
1948	38,328	36,444	36,024	39,012	37,386	36,932	37,452	39,778	—6.0	—7.2	—5.9
1949	38,904	37,104	40,044	40,608	38,004	38,684	39,165	39,038	—2.7	—0.9	+0.3
1950	37,368	42,804	43,680	42,036	40,086	41,284	41,472	43,279	—7.4	—4.6	—4.2
1951	43,788	39,372	43,392	41,472	41,580	42,184	42,006	44,516	—6.6	—5.2	—5.6
1952	49,056	49,824	47,556	47,820	49,440	48,812	48,564	45,821	+7.9	+6.5	+6.0
1953	46,800	48,588	44,244	47,976	47,694	46,544	46,902	49,279	—3.2	—5.6	—4.8
1954	56,520	52,500	54,780	54,516	54,510	54,600	54,579	53,930	+1.1	+1.2	+1.2
1955	52,404	54,636	58,980	62,400	53,520	55,340	57,105	56,682	—5.6	—2.4	+0.7
1956	55,164	57,516	63,936	57,660	56,340	58,872	58,569	58,160	—3.1	+1.2	+0.7
1957	49,116	68,088	54,192	51,468	58,602	57,132	55,716	53,838	+8.8	+6.1	+3.5
1958	58,392	47,220	44,028	41,232	52,806	49,880	47,718	49,111	+7.5	+1.6	—2.8
1959	52,992	48,636	51,900	57,084	50,814	51,176	52,653	50,893	—0.2	+0.6	+3.5
1960	47,400	43,080	48,972	.....	45,240	46,484	.....	.....	.....	.....	.....
								1947-1959 Average Deviation	±4.87%	±3.60%	±3.40%

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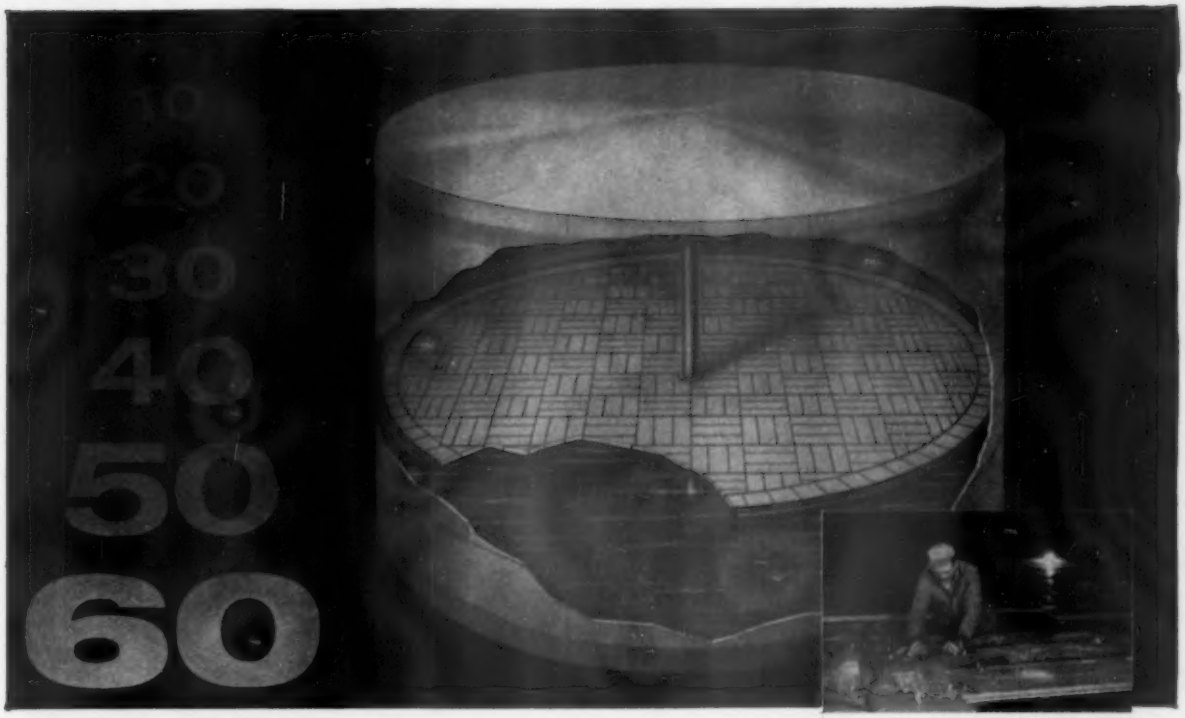

70 ft. HAMONDFLOTE COVER

converts old riveted vessel to modern floating roof tank

A rigid foam plastic Hamondflote Cover was quickly and easily installed in this 70 ft. diameter riveted tank. Using conventional hand tools in a simple assembly operation, maintenance personnel converted the vessel to an efficient conservation tank.

SIZE IS NO LIMITATION . . . the Hamondflote Cover can be used to modernize tanks up to any diameter in use today, regardless of the number or location of supporting columns. It reduces evaporation losses by as much as 95%, is completely resistant to a wide range of chemicals and petroleum hydrocarbons and will withstand temperatures from −94°F. to +300°F.

Write for bulletin which tells the entire Hamondflote Cover story.

1. Sections of the Hamondflote Plastic Cover are easily put together with tongue and groove joints and simple hand-tightened clamps.

2. Here the 70 ft. Cover is almost completed. Note that it is strong and rigid enough to support the workman's weight.

3. Rivets, columns and other protrusions on the inside wall of the tank present no problems. The flexible packing gland easily slides over them when the roof is rising or falling with the liquid level.

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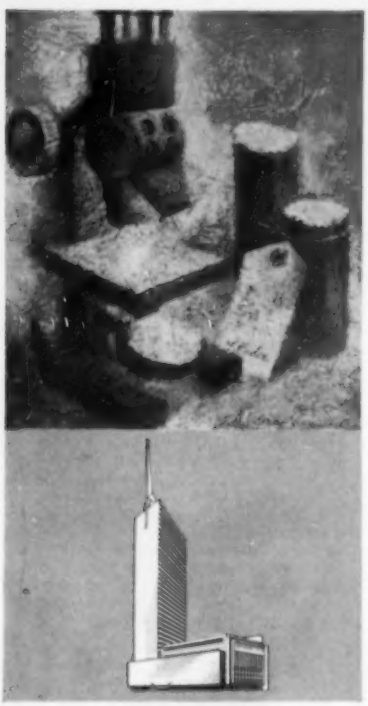

REPUBLIC NATIONAL BANK OF DALLAS

CAPITAL AND SURPLUS $102,000,000

LARGEST IN THE SOUTH

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

What's New / IN THE INDUSTRY

Humble Oil & Refining Co. will field-test alternate brand names for its products nationwide, but it will not tinker with the "corporate flag."

In other words, a spokesman indicated, the company has no plans to market nationally under any name other than Humble Oil & Refining Co.

Several brand names are under consideration, with the probability that "Enco" will be tried first. The spokesman said a small marketing area will be selected for the field test, and that the results will help officials to make up their minds.

•

Mobil Oil Co. next week will become the second major to market tetramethyl gasoline.

Effective Tuesday, it will offer "Mobil Methyl" at all service stations in the Syracuse (N.Y.) area, at no increase in the wholesale price.

Earlier this month, Standard Oil Co. of California opened an intensive promotion campaign for the new antiknock additive (PW—May6'60,p58).

•

A reduction of 20¢ per bbl. for Kansas crude was posted this week by Derby Refining Co. of Wichita. The price cut affects 15,880 b/d.

Producers set up a special committee immediately to urge the company to rescind the cut.

The new top posting is $2.85 per bbl. for 40-gravity, compared with the old price of $3.05 for 40-44-gravity crude.

Derby revised its gravity scale too, subtracting 3¢ for each degree below 40-gravity, and initiating a 2¢-per-degree penalty for crude above 40-gravity.

•

Legal arguments will be heard Monday on a defense plea to seal certain parts of the pretrial record of a long-pending antitrust suit against three oil companies.

Defendants in the case, which comes up in U.S. District Court in Louisville, Ky., are Standard Oil Co. (N.J.), Esso Standard Oil Co. (now a division of Humble Oil & Refining Co., a Jersey subsidiary), and Standard Oil Co. (Ky.).

The defense wants to limit use of documents produced or answers given in the pretrial proceedings. The effect would be to bar inspection by the press or public.

The government suit, a civil case filed in late 1958 (PW—Dec.5'58, p11), alleges that Jersey, Esso, and other affiliates of Jersey, had made an agreement with Kentucky Standard under which the latter was "allocated" a five-state market area. It also charges that a purchase contract made in 1956 requires Kentucky to buy 80% of some of its major products from Esso.

•

The proposed merger of Consolidated Gas Utilities Corp. into Arkansas Louisiana Gas Co. has been approved by stockholders of both firms.

Federal Power Commission and Arkansas Public Service Commission approvals are needed, however, before the merger can become effective.

Both firms operate integrated natural gas systems, and the surviving company will serve about 365,000 customers in Oklahoma, Kansas, Arkansas, Texas, and Louisiana.

•

The country's largest crude still will go on computer control sometime this summer. Standard Oil Co. (Ind.) disclosed last week that it would use an open-loop system initially on the 140,000 b/d No. 12 pipe still at its Whiting (Ind.) refinery, but that it would probably switch to closed-loop control by the end of the year.

The company expects the increase in efficiency to result in an annual saving of $200,000 to $500,000. If the Whiting experience is good, computer control will probably be installed also on the 150,000 b/d crude unit planned for the Texas City (Tex.) refinery of American Oil Co., an affiliate.

•

Dates and places have been set for the next five midyear meetings of the API Division of Refining.

They are as follows: 1961, May 8-11, Houston; 1962, May 14-17, San Francisco; 1963, May 13-16, Philadelphia; 1964, May 11-14, St. Louis; and 1965, May 10-13, Montreal.

Close to 1,500 refiners attended last week's midyear meeting in Detroit.

U-36 ELECTRA-FLOW RIG

Electric power for complete rig operation is provided by two Cummins VT-12 TURBODIESEL Engine and GT-602 generator combinations.

Power to the U-36 Drawworks is supplied by a General Electric GE-752 motor. An identical motor powers the mud pump.

Mid-Continent Engineered for Medium-depth Drilling

Reduced rig-up time, less maintenance, and efficient power distribution are features of an all-electric, medium-depth rig engineered by Mid-Continent for Slats Honeymon Drilling Company. Now drilling in Oklahoma, the rig is designed around a Mid-Continent U-36-A Drawworks rated at 300 to 600 net input horsepower. This type rig offers excellent portability for fast moves over difficult terrain, and flexibility in rig-up on rugged locations. Whether you may be considering Electra-Flow or mechanical drive, call Mid-Continent for complete information on the U-36.

DW3-0

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Looking Ahead in Washington

McGraw-Hill
Washington
Bureau
May 20, 1960

Take a look at congressional retirements this year; some will affect the petroleum industry's interests in Washington. In the Senate, only four men so far have announced that they will not seek reelection. But this small group includes senators who have been powerful in oil and gas affairs.

•

Sen. James Murray (D., Mont.) is quitting and will vacate his post as chairman of the Senate Interior Committee. Murray, a supporter of petroleum legislation, will be succeeded as committee chairman by Sen. Clinton P. Anderson (D., N.M.). Anderson also is an industry backer, but has been more vigorous than Murray, for example, in seeking tight leasing regulations. Anderson's elevation to the chairmanship, of course, assumes his own reelection and a Senate Democratic majority next year.

One of the candidates for Murray's Senate seat is critical of oil depletion. Montana's two House members—Democrats Lee Metcalf and LeRoy Anderson—are campaigning for the party nomination to succeed Murray. Metcalf has called for tightening of the oil and gas depletion provision, and is being rebuked by the outgoing Murray.

The retirement of Sen. Joseph C. O'Mahoney (D., Wyo.) may reduce the threat to foreign oil depletion. O'Mahoney, a ranking member of the Senate Judiciary and Interior Committee, has taken a strong domestic position on most intra-industry controversies. He has introduced legislation to spell out Congressional authority for mandatory import restrictions, but the bill never progresses. O'Mahoney, as a top member of the Senate's Antitrust subcommittee, has been critical of major oil company operations, and particularly of the application of the depletion provision to foreign production.

•

Other Senate retirees are Theodore F. Green (D., R.I.) and Thomas Martin (R., Iowa). Although neither has played any major role on oil and gas matters in the Senate, their successors will be important in close votes. Martin, a conservative Republican, has backed many industry measures. Green has opposed the industry position in several instances.

•

Retirements in the House are mounting, and some key committee posts will be open. Among the 26 members who have already announced their retirements or who are expected to do so are such powerful figures as Rep. Graham Barden (D., N.C.), chairman of the House Labor Committee; Rep. Leo Allen (R., Ill.), ranking GOP member of the Rules Committee; Rep. Aime Forand (D., R.I.), strong tax-writer of the Ways & Means Committee, and Rep. Carl Durham (D., N.C.), ranking House member on the Joint Atomic Energy Committee. If the Democrats are able to hold on to a House majority, Rep. Adam Clayton Powell (D., N.Y.) would succeed to the chairmanship of the House Labor Committee.

•

Construction scandals in the Interstate Highway Program may hurt the Administration's push for another tax increase on motor fuels. A special House committee, after hearing testimony on charges of corruption in building only 13.8 mi. of federal-aid highway near Tulsa, is looking at other allegations of misuse of federal funds.

4 STEPS TO SUCCESS

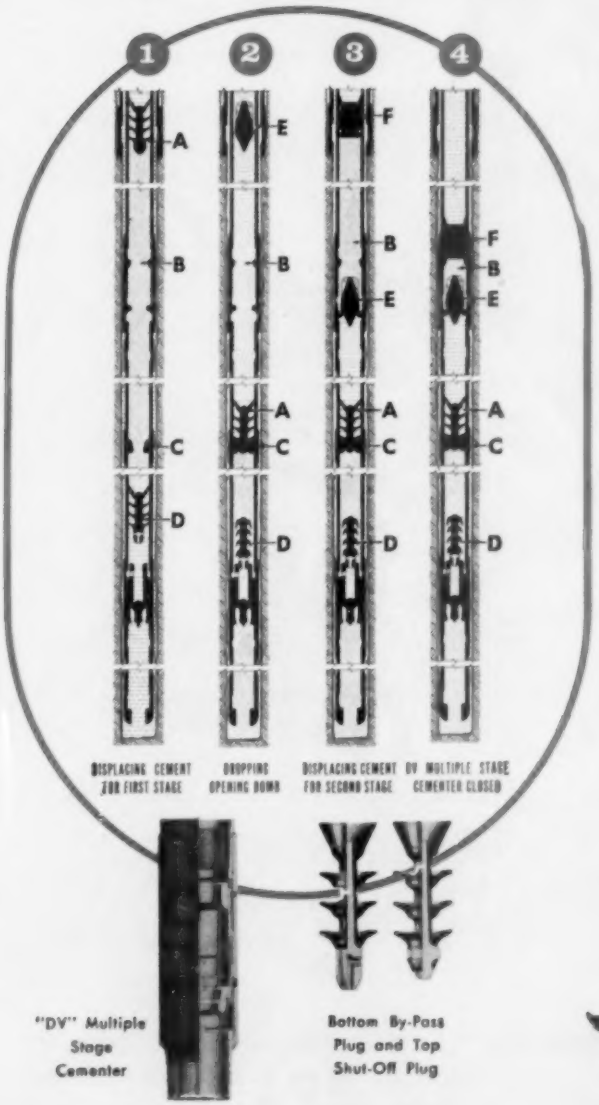
IN MULTI-STAGE CEMENTING

If you've thought of multiple stage cementing only in connection with multi-zone completions, you may be missing many benefits that could be yours by using this system in conventional primary cementing. For instance,

DID YOU KNOW THAT MULTIPLE STAGE CEMENTING CAN HELP YOU . . .

- Get better *full depth* cementing?
- Reduce cement pumping pressures and possibility of channeling?
- Minimize cement slurry loss to thieving formations?
- Pinpoint cement placement at any depth?

The schematic drawings illustrate the *Steps to Success* in multiple stage cementing developed by Halliburton over the past 30 years.



1 STEP ONE . . . Bottom By-Pass Plug (D) leads the cement, displacing well fluid ahead of it, and seats in the By-Pass Baffle located on top of the Super Seal Float Collar after passing through the "DV" tool (ports closed). Openings in the Bottom Plug allow passage of cement through the plug. Shut-Off Plug (A) follows cement and seats in its Baffle (C) to complete the first stage job.

2 STEP TWO . . . Opening Bomb (E) is dropped through casing and seats in "DV" tool (B). Pressure is applied, opening the "DV" cementing ports.

3 STEP THREE . . . Second stage cement is pumped down, followed by Closing Plug (F).

4 STEP FOUR . . . Displacing fluid pumped behind Closing Plug (F) moves the cement through the open ports in the "DV" tool until Closing Plug (F) is seated in top of the tool which closes the ports and completes the job.

"DV" MULTIPLE STAGE CEMENTER . . .
is hydraulically operated by pump pressure to open after passage of first stage cement and close at completion of second stage.

BOTTOM BY-PASS AND TOP SHUT-OFF PLUGS . . .
for first (lower) stage of job. Note openings in bottom plug to allow passage of cement through Float Collar and Guide Shoe.

Ask your nearby Halliburton Representative to explain how this experience can pay off for you.

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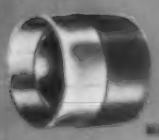
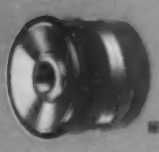
* Mission pump parts work together

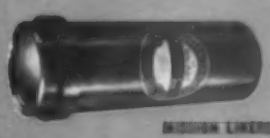
MISSION VALVES



MISSION GLAND PACKING



MISSION PISTONS



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MISSION PISTON RODS

MISSION LINER PACKING

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Job Scarcity Hits Geologists

- **Some say it hasn't been so bad since the depression**
- **Long-range, however, the outlook is still bright**

This years's crop of new geologists is facing the toughest job situation in more than 20 years.

A PETROLEUM WEEK survey of oil companies, geologists, colleges, and others indicates that the problem may even get a little worse before it gets better.

One major company official says: "Geologists about 35 years old have never known anything but a great, rising demand. Now that we've dropped a little and leveled off, it looks bad to them. Oldtimers could tell you how bad things can really get."

The peak in job opportunities came about 1955, following an accelerating rise since the mid-40s. Then it started to level off until 1957, when demand fell suddenly.

The story is pretty much the same throughout the country: Hiring of geologists is virtually on a replacement basis only, and some companies aren't even doing that.

Says the chief geologist of one southwest major: "As far as hiring is concerned, we are replacing losses caused by the few terminations, by promotions, or due to our transferring men from domestic work to foreign subsidiaries.

"Our job openings are few and far between. At the same time, I see at least one applicant per day, and personnel turns away that many, and sometimes more."

Another major company official reports: "We aren't hiring as many men as we're losing through natural attrition. I doubt that we are hiring as many men as we did last year.

"Two years ago we reached a balanced complement of geologists within the organization, and our needs were naturally reduced.

"We had a great number of young geologists on hand. As they gained experience, their production greatly increased. This means that we now do not need as many geologists as we did in the past."

One mid-continent major has made sizeable reductions in its geology department and expects to make further cuts next year.

There are a few reports of increases in geological staffs, but these are the exceptions.

The U.S. Geological Survey—the largest single employer of geologists in the country—expects to hire from 20 to 30 full-time geologists this summer. Five to six years ago, USGS hired from 100 to 150 a year.

Much of the slack in USGS hiring, however, is due to a retrenchment in the atomic energy program, insofar as USGS participation is concerned.

An agency official says that many of the geologists released from the AEC program have been absorbed in the regular program. But some minimally trained geologists, and those at or near retirement age, have been cut off.

In addition to the full-time geologists hired, a lesser number of part-time workers will be hired for summer field work. During the peak years, from 50 to 75 part-time geologists were hired for such jobs.

"Generally," the USGS official adds, "the demand for geologists is less than at any time since the depression."

But while the present outlook is far from bright, the consensus is that the long-range outlook is still solid. Some even predict a shortage of geologists by 1965 or 1966.

One theme recurrent in the replies to the PETROLEUM WEEK survey is that the current oversupply is but a temporary dislocation, and that better times are surely ahead.

The number of graduates in geology is declining, and is expected to reach a low point next year; this will help reduce the supply-demand imbalance.

And, says Paul Lyons, of Sinclair Oil & Gas Co., a pinch in reserves is likely to develop around 1964, with demand still increasing. If product prices increase, there should be a spurt in exploration, he predicts, as all companies look to their reserves.

The current oversupply of geologists is rooted in many factors, most of them temporary in nature.

Lewis Weeks, president of the American Assn. of Petroleum Geologists, told that group at its annual meeting in Atlantic City recently that the amount of unemployment among geologists is more unusual at this time because of the worldwide prosperity and high demand for men in other sciences and professions.

Ben H. Parker, exploration vice-president of Frontier Refining Co. and president-elect of AAPG, told PETROLEUM WEEK: "The oversupply results from two principal factors:

"First, the great number of students attracted to geology following the war because of the pronounced shortage in trained personnel resulting from the disruption of training during the war and the natural expansion of exploration activities that came when wartime restrictions ended.

"Second, the current oversupply of petroleum productive capacity and reserves resulting from the very great successes in exploration throughout the world in the past decade."

He added that present "scanty" information indicates that there is a six- to eight-year period between peaks of supply and demand for technical personnel in exploration.

The American Assn. of Petroleum Geologists has set up a committee to study the employment problem.

AAPG's Executive Committee decided at the Atlantic City meeting that the only feasible solution of the problem is a long-range approach.

The first step in this approach is the formation of an Industrial & Academic Relations Committee.

Parker said this will be a fact-finding committee, "devoted to securing better knowledge and understanding of the current employment situation in geology and the future trends for employment.

Parker noted that the committee is not a "panacea for the immediate remedy of current unemployment. Rather, we hope that by the gathering of facts on employment and the interpretation of trends of exploration activity in the future, a basis may be established whereby critical shortages and surpluses of trained personnel that have alternately existed in the past may be prevented in the future."

The oversupply of applicants is

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giving employers greater selectivity. The well-trained geologist with an advanced degree is preferred.

A spokesman for a major says: "We always try to get the best man available. With the supply situation the way it is, we can be more choosy." He adds that his company emphasizes the hiring of graduates holding master's or doctor's degrees over those holding only a bachelor's degree.

But, he notes, "there are so many men with master's degrees that we generally take the more educated man.

There are some cases where we hire exceptionally good men with bachelor's degrees. But a man with a bachelor's degree has a darn poor chance of getting a job. We encourage these people to return to school for an additional degree."

Geologists holding doctor's degrees are being hired by many companies to do research work. And since there still aren't too many such geologists entering the market, the group as a whole is finding job opportunities adequate, if not plentiful.

Additionally, the holders of advanced degrees are given better starting salaries.

One company says it pays masters $25 to $35 more per month than it pays bachelors. And PhD's earn from $75 to $150 more per month, to start.

One Mid-Continent major, however, says, "We're not so hipped on the higher degrees as some companies. Some of our best people haven't even a bachelor's degree. We look for aptitude and brainpower."

Experience is discounted as a strong point by many employers.

One major company official explains, "We hire almost all of our geologists directly out of college. We don't place too much value on experience obtained elsewhere.

"We find that graduates hired by the company are easier to indoctrinate than those who have worked elsewhere. Also, the college graduate fits into the company pattern easier."

Says another official: "Some schools seem to be forsaking fundamentals and are turning into trade schools. We'd prefer that the students have a wider foundation. Schools don't need to train the geologists to be petroleum geologists. If they'll turn out geologists, we'll teach them all they need to know about the petroleum angle."

And a third says: "I think experience is always valuable if a man has as much as four or five years in the field. However, we'd just as soon hire a man right out of college as hire one who has only a year's experience."

USGS reports that the increasing number of applicants for federal geological jobs is "a source of embarrassment to us. An experienced oil geologist is not necessarily qualified for these jobs. Actually, there is a shortage of really qualified geologists to meet the higher standards and special needs of federal jobs."

There also is a new awareness of the need for a broader base of learning, with emphasis on related sciences, such as physics, chemistry, and math.

Weeks stressed this point in his Atlantic City talk. He said:

"Young men are preferred who have not only a sound training in geology, but a broad base in the other sciences as well. Geology is unique in that a sound understanding of it is impossible without a reasonably good background in the other sciences."

And John Lonsdale, of the Texas Bureau of Economic Geology, says, "Oil companies are looking for geologists who can comprehend the new sciences and integrate them into effective geological departments."

Edgar W. Owen, past-president of AAPG, adds: "I believe some company recruiters have stressed technical training too much. I think the geologists coming up must have other training—in languages, humanities, other sciences, and the like. Let the company give the specific training."

There is general agreement that today's geologist is, in fact, better trained than ever before.

Now that the hurly-burly of the immediate postwar years has ended, the emphasis is on upgrading—in school staffs, curricula, and students.

Commenting on the early postwar period, one geologist with a major company says, "Universities then ground out geologists like wieners. Only roughly 10% were really capable. Demand was terriffic, so men were rushed through schools to be met with six to eight job offers on graduation.

"Because the character of the business has changed, more engineering and economics are involved. The schools that have emphasized earth sciences and mathematics, the fundamentals rather than practical know-how, have held up through the years, and will do so in the future."

Some schools, such as the University of Texas, for instance, are offering special seminars for geologists. These seminars cover a wide range of subjects—including languages.

And the fact that more students are working for advanced degrees—some even in fields other than geology—is contributing to the general upgrading now evident.

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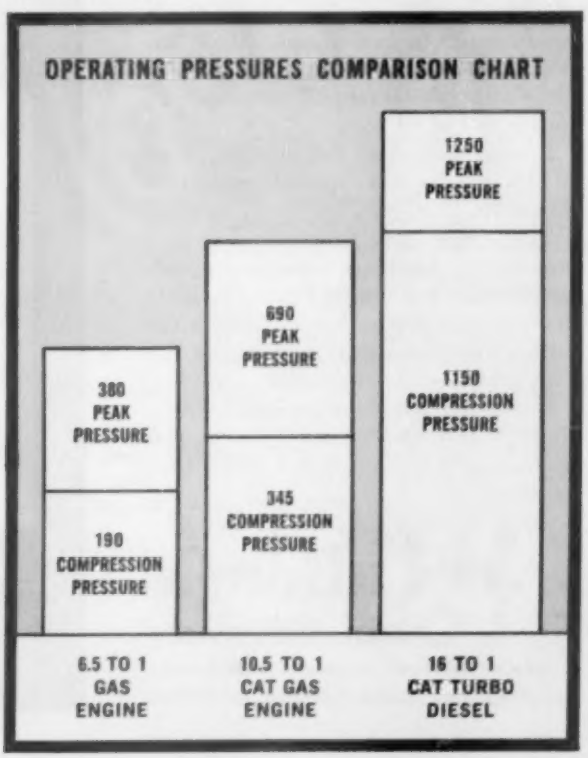

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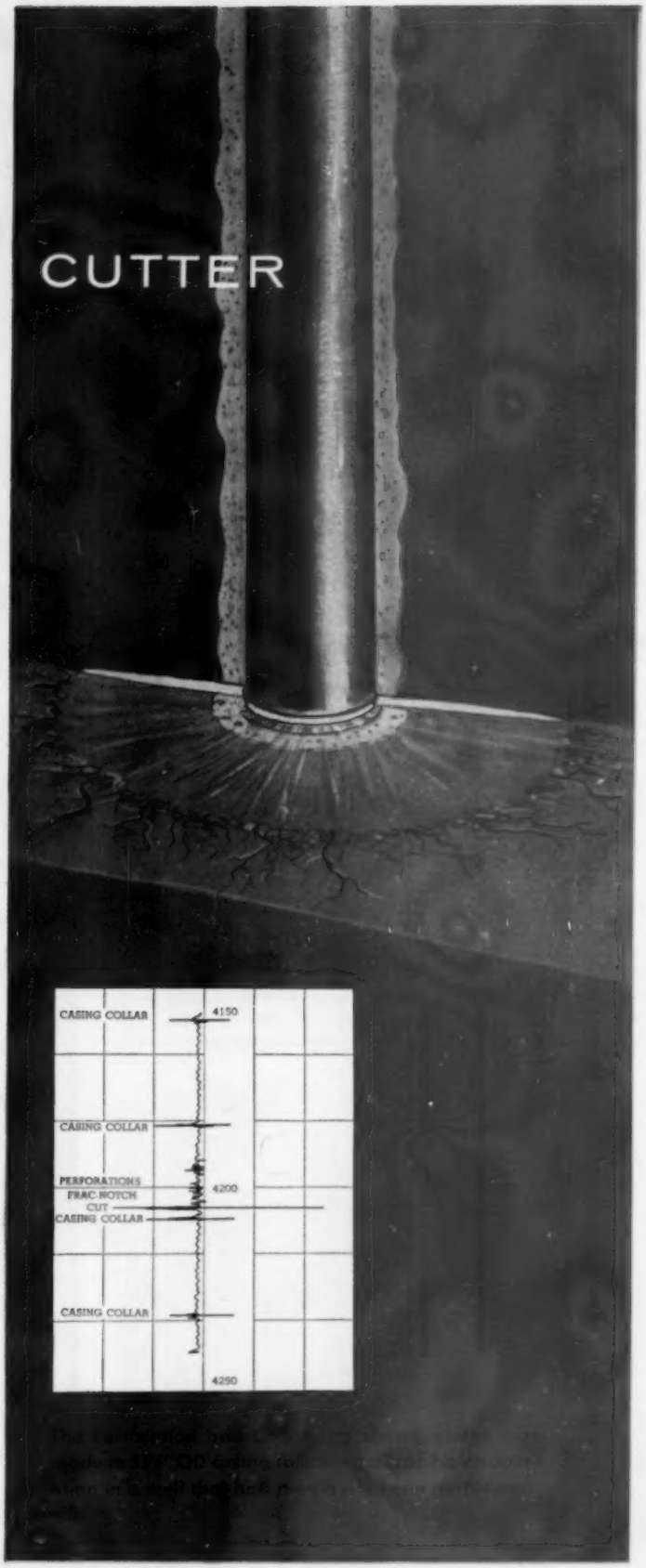

This newly developed electric wire line tool, utilizing an improved jet cutting process, makes it possible to get up to 100 times more effective hydraulic fracturing power—to improve production as much as 30 times over other methods.

McCullough's Frac-Notch Cutter cuts a circular notch horizontally through casing, cement and as much as 15 inches into the formation around the entire circumference of the well bore. Concentration of hydraulic fracturing power in this notched area results in the application of enormous pressure against the formation. For example—a hydraulic fracturing pressure of 5,000 psi applied to a notch in 5" ID casing results in more than 1,400,000 lbs. pressure against the formation in the circular notch—fracturing thousands of square feet of oil zone.

In wells treated by this process, where 25 bbls. per day was expected, production is over 700 bbls. per day.

The Frac-Notch Cutter is fast and economical. Additional economy is realized because it is usually run on the same Service Unit set-up immediately after collar and radioactivity logging for correlation and depth control.

It will pay you, as it has many others, to look into the advantages of the McCullough Frac-Notch Cutter. Call us today!

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Tempo Quickens at Virginia Hills

Alberta's Virginia Hills field is spurting in both size and productivity, after getting off to a slow start from its discovery in 1957.

Virginia Hills was discovered by Home Oil Co., concurrently with the company's discovery of Swan Hills, 26 mi. northeast.

Follow-up drilling, however, was unsuccessful—unlike that at Swan Hills—and development moved slowly.

Just two years ago, in fact, Virginia Hills looked as if it might be a major disappointment in the oil-rich region that includes the outstanding Swan Hills and the promising Judy Creek fields.

But now the field has more than 25 producers. And several tests are being drilled as development pushes ahead rapidly.

The recent field limit order of the Alberta Oil & Gas Conservation Board shows Virginia Hills has roughly tripled in size since the previous field limit order of March, 1959.

A wildcat completed last fall to extend the productive limits of the field 3½ mi. southeast is the biggest reason behind the brightened outlook.

This well, Hudson's Bay, Union Oil, and Home Oil No. 4-2, 1sd 4-2-65-13w5, uncovered more than 90 ft. of net pay.

Further impetus was added by the completion of Hudson's Bay, Union, Home, and Shell No. 10-10, 1sd 10-10-65-13w5, for 429 b/d of oil, 4½ mi. northwest of No. 4-2.

No. 10-10 is reported to have found 118 ft. of pay at about 9,200 ft. in the Slave Point member of the Beaverhill Lake (Devonian) formation.

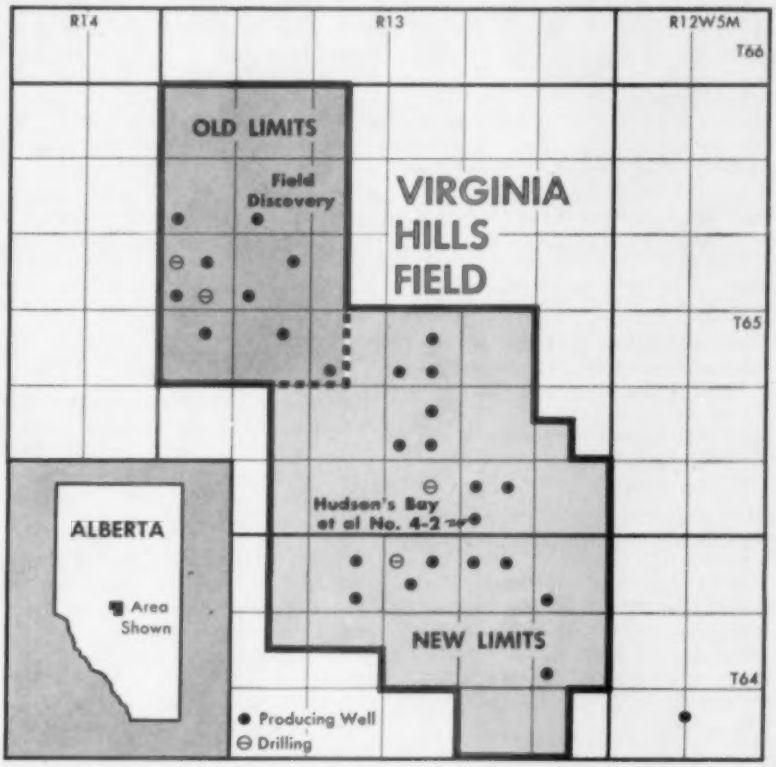
Wells drilled subsequent to Nos. 4-2 and 10-10 have revealed pay zones up to 130 ft. thick.

The upsurge in field activity generated by the No. 4-2 wildcat took immediate shape in the form of an 18-hole development program planned for completion this year.

The program will be conducted by the team of Hudson's Bay, Home Oil, and Union Oil Co. of California on an 86,400-acre reservation in the No. 4-2 area, with Hudson's Bay as operator.

Fifteen producers have been completed by the team, most of these during the past winter when the group had five rigs active.

Hudson's Bay, Home, Union, and Shell have completed three producers jointly and the same group minus Shell has completed 12 producers.



Hudson's Bay has been the operator in all cases.

Other operators in the field include Skelly Oil, Atlantic Refining, Sinclair Canada, and J. Ray McDermott.

Most of the field's southerly development has been supplied by Shell Oil Co.

In early 1959 Shell, completed No. 6-34, 1sd 6-34-64-13w5, and named it Shell Swan Hills. The name has since been changed to Virginia Hills. Several producers have been completed in the area since.

The Shell development confirms the existence of the producing reef section for at least 5 mi. in a northwest-southeast direction.

An exception to this trend is the recent completion of Skelly Alta Q-1 10-36, 1sd 10-36-64-14w5.

This well, a venture of Skelly as operator, Sohio, and Canadian Devonian Petroleums, is outside the field's present limits, and is about 4½ mi. southwest of the field discovery.

Operators feel the productive limits of the field haven't been fully established.

The field has been defined on the northeast side by dry holes, but it hasn't been limited in other directions.

Dry holes have been drilled on all sides of the field, but they are considered by observers as too widely spaced to truly delineate field limits.

Because of the distance between dry holes, a few operators have mentioned the possibility of Virginia Hills linking with Judy Creek field, 12 mi. southeast.

Generally, however, this is thought to be only "a remote possibility."

The remoteness of the field has hindered development. But a new access road, now almost complete, will ease the situation.

Unlike Swan Hills and Judy Creek fields, there are no settlements near Virginia Hills. With no roads, work has been conducted only during freeze-up.

Last year a 30-mi. access road into the area was started from Whitecourt highway at a cost of about $15,000 per mi. The road was within 6 mi. of completion at last report.

With the road smoothing the way for year-round operations, one operator predicts that development drilling will continue in Virginia Hills for the next five years, with the only interruptions caused by temporary shutdowns forced by thawing.

Wells in the Virginia Hills field are

drilled and completed in about 35 days at a total cost of about $172,000 each.

Production comes from a Slave Point limestone reef at an average depth of around 9,200 ft. The oil averages about 38-gravity.

Field production moves to market through a 14-mi., 8-in. extension of the Federated Pipe Lines system, which is jointly owned by Home Oil, the operator, and Texaco Canada. The main line runs from Swan Hills field to Edmonton.

The May allowable for the field, which is on 160-acre spacing, is 2,073 b/d, or about 80 b/d per well.

Leasing activity probably will continue in Virginia Hills for some time.

There is a considerable amount of Crown Research land left in various parts of the area which can become available through sales.

Further lease sales by the government are expected as companies convert the land from reservation to lease status.

In the lease sale last month, Hudson's Bay paid $950,662 for one 640-acre parcel and $100,659 for another 640-acre tract. Both are in T65-R13. Skelly paid $356,000 and $81,772 for 640-acre tracts in T64-R13 and T65-R14, respectively.

Perforator Makes Big Holes

A shaped-charge perforator that makes big-diameter (1-in.) holes to a depth of around 6 in. has been developed by Petroleum Tool Research, Inc., Dallas.

The tool, designated the Mark 29, was designed by Henry Mohaupt, PTR president.

Mohaupt claims the perforator—made in 3⅜-in. OD and 4⅛-in. OD sizes—has the power and advantage of an open-hole jet charge with the safety of the hollow-carrier-type perforator.

The objective in designing the Mark 29 was to make bigger holes in order to provide a bigger opening in the casing. This would reduce the horsepower required to force fracturing fluid into the formation. The larger holes also would prevent sand from piling up at the end of the perforation.

Tests run so far in several states indicate that the jet perforator reduces the breakdown pressures needed in fracturing.

Mohaupt reports that the perforator has been used in North Dakota, Wyoming, Louisiana, and the Denver-Julesburg Basin.

He reports that one hole which had been treated conventionally failed to break down under 4,000 psi. The hole was perforated with the Mark 29 and the formation broke down under 2,700 psi.

Another major company, he says, had tested the tool in very hard Berea sandstone, getting holes averaging 0.9 to 1.1 in. in diameter, averaging 4.61 in. in depth. Mohaupt says that penetrations up to 6.25 in. beyond cement have been obtained.

Charges are linked together in an expendable glass container. The tool is lowered by conventional wireline.

The smaller Mark 29 perforator consists of a ¼-in.-thick glass tube with magnesium bottom nose and top connections. Each charge contains 50 grams of RDX explosive behind a copper liner, centered in the tube at two or three shots per foot.

Because there are no portholes in the carrier, Mohaupt says, the possibility of a wet run is virtually eliminated. And since it is sealed, he says, it will take up to 10,000 psi. working pressure, adding that it has been run to 11,500 ft. under heavy mud on an actual job.

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USI Axelson PUMPING NEWS

Rising Costs Increase Use of On-or-Off Attachment

Saves Stripping Jobs. For over 20 years operators have been using the Axelson On-or-Off attachment as a safety joint to protect the rod string investment in sandy wells. It is impossible to estimate how many stripping jobs this attachment has prevented, or how many tens of thousands of dollars it has saved producers over that period of time.

After Sand-Fracing. In many sections of the oil country, it has become standard practice to install the On-or-Off attachment whenever a pump is run after a sand-frac job, because of the severe sanding up which may occur.

Reports from the field give many other uses of the On-or-Off attachment. For example:

Two-Zone Pumping. In West Texas the attachment is being used on practically every two-zone pump installation. Its use allows the pump to be run on the tubing, as a safety factor. It also insures proper spacing and seating of the pump.

Running Insert Pump. The On-or-Off tool is frequently employed when running a long insert pump through tubing to guard against the possibility of a stripping job if the pump becomes stuck in a tight spot.

High Water Cut Wells. Another cost-cutting application of the On-or-Off attachment is in wells where increasing water encroachment compels greater fluid lift for economical production. With the attachment, larger bore pumps can be used without going to larger size tubing or having to run the rods and tubing together. For instance, a 2½" TL pump can be used on 2" tubing, or a 4" pump on 2½" tubing. In the same type of application, the On-or-Off attachment can be used with a casing pump.

Easier Paraffin Removal. Wells with moderate paraffin conditions often handle the problem by installing paraffin knives or a series of scrapers above the On-or-Off attachment. This allows the rod string to be released, paraffin removed and the string re-set, all without unseating the pump.

Ask your Axelson representative to show you how the exclusive positive load action of the On-or-Off attachment keeps the threads shouldered at all times for positive seal. The attachment also has a self-centering action. Only ⅛ turn rotation is needed to release, and both engagement and disengagement are positive. When engaged, the unit is as solid as a one-piece coupling, and foreign matter cannot enter.

How to Select the Proper Polished Rod

The one right polished rod for any pumping job is the one which best combines required strength and wearing qualities at lowest cost. Since no single material can do this under all conditions, Axelson supplies a complete line of polished rods of different metals and characteristics.

For light service #55 rods of cold-drawn carbon steel are usually recommended.

Medium service indicates #60 rods of medium carbon steel.

For normal to heavy service, alloy steel specially treated is used in #59 rods.

For special conditions involving severe corrosion and/or abrasion, Axelson polished rods are available in bronze, stainless steel, Axtrahard hard-faced, and chromium-plated.

"Triple-H" Polished Rods. These are an example of the new materials which Axelson research is developing. "Triple-H" polished rods are currently available in two lengths for the 26-foot and 31-foot Hydrax Pumping Units. This rod is made from a special stainless steel alloy, precipitation-hardened to a Rockwell C reading of about 40. It is extremely resistant to both abrasion and corrosion, and has a tensile strength of approximately 110,000 psi minimum yield.

"Triple-H" rods have seen wide use, particularly in West Texas wells where corrosion is severe and abrasion has always been a problem. "Triple-H" rods have been carefully inspected after two years continuous service under these difficult conditions, and no measurable wear, corrosion or metal fatigue has been found. The conclusion is definite that "Triple-H" polished rods outwear and outperform all others under severe conditions.

"Triple-H" rods are held to finish tolerances of less than .003"—a necessity with the high-pressure seals of hydraulic pumping units.

The maximum straightness and finer finish of all Axelson polished rods pays off at the well head in lowest possible friction losses for longer rod and packing life and reduced downtime.

Packing also is important for best service, and should be carefully chosen. Marlo packing cuts costs and friction both, because its special semi-metallic inserts form a smooth, resilient bearing-like surface which stands up in heavy service and will not harden or burn during pumpoff.

Your Axelson representative is qualified to recommend the combination of polished rod and Marlo packing which will give you greatest service with long term economy.

Tests show that the surface of an Axelson polished rod is measurably smoother than that of ordinary milled-finish rods. Axelson creates this finish by centerless grinding—a more expensive method, but the only one which will finish to Axelson specifications. In addition, close tolerances are held throughout manufacture to insure maximum straightness.

Electro-Motive power sets drilling record . . .

Kermac 46 hits 10,000 feet in 4 days, 22 hours

Kermac 47 strikes same depth in 5 days, 18 hours

Using three Electro-Motive 900-hp generating units to power electric drive motors on draw works, rotary and mud pumps, Kermac 46, drilling for Gulf Oil Corp., cut the established 10-day drilling record in half. This was accomplished by using heavy bit weight and high rotary speed.

Rotating at 150 to 275 rpm, rotary speed was slowed by adding weight to the bit rather than reducing rotary power. In spite of heavy loading, only five bits were used.

Direct current motors on Electro-Motive equipment are series wound, a factor that makes possible smooth and rapid acceleration of loads with positive control of speed and torque. Thus, accurate control of horsepower can be maintained over a full range of rotating speeds. Simple, single-cabinet controls provide the driller maximum flexibility in power distribution to shorten drilling time, lower costs.

This same drilling method of high rotary speed and heavy bit weight was utilized on Kermac 47 when it reached 10,000 feet in 5 days, 18 hours.

Electro-Motive Power is power to make hole fast; flexible to meet varying drilling conditions; simple, accurate controls; matched components, designed and built by *one* manufacturer—reasons why both land and offshore rigs are successfully reducing drilling time and costs. Why not ask your Electro-Motive representative for full details?

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Pros and Cons of Drilling Contracts

John S. Hagestad, John S. Hagestad Drilling Co., and William J. Johnston, Standard Oil Co. of California, discussed some of the troublesome clauses in drilling contracts at last week's Pacific Coast Production Division meeting of API.

A CONTRACTOR'S VIEW

• **Changes in hole size** affect the penetration rate and should not be permitted after the contract is let, without recourse to changes in the contract. Any change in the hole size can completely change the program and may find the contractor lacking in the new required drill collar sizes.

• **Lost circulation** responsibility (which usually shifts to the operator either immediately upon notice, after a specified time, or after drillpipe is out of the hole) should rest with the operator from the very start, with no regard as to whether the pipe is out of the hole.

• **Hourly rate responsibility:** The contractor's responsibility for his tools while on hourly rate should be covered by additional reimbursement. It's to his benefit, while on hourly rates, to do everything within his ability to complete the job successfully. In doing this work, human errors can and do take place. Human error can't be classed as negligence, which is the contractor's responsibility.

• **When tools are lost in the hole** through no fault of the contractor, the operator should settle for replacement value. Under present day bidding, the operator earns no right to depreciation of tools lost in hole, as depreciation of tools belongs only to the contractor. There appears to be a growing trend to settle on replacement value less some percentage discount, supposedly based on the idea that the tools lost were not in the best condition. Though the tool may be depreciated on the contractor's books, it has the value of a new tool.

• **Mud specifications** required in drilling a hole should be plainly stated. Any change required thereafter, including the use of oil-emulsion muds, should be resolved at the expense of the operator.

• **The use of oil-base mud** entitles the contractor to additional payment. Deterioration of materials made from or containing rubber is a big problem when using oil-base mud. The amount of damage is generally dependent on the length of time the oil-base mud is used. The additional compensation should include the cost of clean-up.

• **All contracts should have a definite end,** releasing the contractor from further liability. Work in addition to the contractural obligations should then be negotiated. Most present contracts continue indefinitely. This is not right, because the contractor is anxious to know he has finished his obligations, and has earned the right to bill the operator for footage work completed.

• **The excess-deviation clause should be waived** whenever feasible. Contractors do not see how an additional degree or two in deviation can affect the well, particularly when it is in the middle of a producing field with wells on all sides. It is distressing when the 3-degree clause is used indiscriminately.

AN OPERATOR'S VIEW

• **Changing the hole size** within reasonable limits of change from that initially programmed should not affect the contract. The contract should be changed only when the hole size is altered beyond those limits. Any change in the footage rate should depend on the range of size change. The day-rate contract should be changed only if the hole change will cause a substantial increase in wear and tear on the equipment.

• **Responsibility for lost circulation** must stay with the one that controls the equipment. This responsibility must remain on the contractor until he meets the particular conditions in the contract which provide for a shift of responsibility. The contractor should evaluate each set of conditions and include it in his bid.

• **On hourly rate,** the contractor should assume the known responsibility for his tools. Some of the areas which should be covered in the contract are the particular items of drilling during which the contractor assumes the risk and a basis for settlement for damage to contractor's equipment that was in questionable condition at the time taken over.

• **If tools are lost in the hole,** the contractor should assume a given percentage loss. The practice of operators paying the full replacement value would tend to reduce the care and degree of concern the contractor would exercise to see the tools were not lost to the same degree that the tools became worn. The large amount of worn drillpipe being used makes it economically necessary to see that such is not lost at the operator's expense.

• **Changes in mud specifications** that are necessary to make the fluid meet or maintain the operator's specifications should be paid for by the contractor. Most operators set forth mud specifications, which include limits on weight and water loss, in their well program. However, the additional cost of substantial changes in the mud should be paid by the operator.

• **Oil-base mud damage** should be borne by the contractor if the use of such mud was called for in the program that accompanied the bid request. If the operator calls for oil-base mud after the job is started, he should pay the contractor's actual cost of clean-up.

• **As for contract termination,** the contractor should agree to tie up his rig for uncertain periods of time. When the contract is let, the operator can't agree to a definite termination date regardless of work performed at that time, because of the uncertainty as to the length of time required to drill, test, and log, etc.

• **Limits on vertical deviation** are a responsibility the contractor must assume at all times except when the operator decides to waive them. In development drilling, conformity to deviation limits is necessary to avoid trespassing on other leases, etc. In exploration, deviation makes fault location and structure relation determination more difficult.

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Six-passenger INTERNATIONAL Travelette® Pickups lead the hunt for oil. Seismograph and geological teams travel in an all-weather protected, factory-warranted cab from base to place . . . their equipment in the pickup body. The Travelette "takes" rugged country without sacrificing passenger comfort. True-truck V-8 engines are standard, "sixes" optional. Four-wheel-drive models available.

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Four-wheel-drive INTERNATIONAL Trucks can move anything from pipe "gunk" and a load of valves to a rigging crew, through the "stickiest" fields. You get a wide selection of wheelbases to permit installation of the correct body lengths to fit your transportation need. Ideal for boom truck adaptation for winch work or pipe gathering. Choice of V-8 or 6-cylinder engines and matching power train for perfect unit-to-job balance.

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Use of ACT Is Soaring in Canada

About 100 automatic custody transfer systems will be installed in Canada this year.

This is the estimate of K. H. Kretzschmar and M. A. Smith, of Mobil Oil of Canada, Ltd.

The two gave the figure at the first joint technical meeting of the Petroleum & Natural Gas division, Canadian Institute of Mining & Metallurgy, and the Rocky Mountain Petroleum Sections, Society of Petroleum Engineers of the American Institute of Mining & Metallurgical Engineers, held in Calgary May 4-6.

There were 120 ACT systems in operation at the end of 1959, compared with only one at the end of 1955.

The Mobil engineers said their survey shows that the rate of growth of this phase of oilfield automation has been "phenomenal."

"This seems to confirm beyond any doubt," they added, "that the Canadian petroleum industry has accepted ACT as a definite improvement over the methods formerly employed to accumulate, measure, and sell crude to a pipeline system."

Present ACT systems reflect a wide variety of designs, though all aim to achieve the same results. Experience gained, however, can be used to advantage in future systems.

Kretzschmar and Smith analyzed the various approaches and came up with some conclusions which they hope will serve as a guide to operators planning future installations.

A good ACT installation, they concluded, must have accuracy, reliability, low cost, and flexibility.

In general, Kretzschmar and Smith said, the principle of simplicity should be stressed as the best means for achieving maximum benefits from ACT and for avoiding operating difficulties which might nullify these benefits.

One trend likely to be established in Canada is the conversion of larger installations to a continuous-transfer basis.

The development of an extremely accurate and reliable means of measuring basic sediment and water content could lead to the direct transfer of all produced fluids to the pipeline, the Mobil engineers said, with dehydration being accomplished at the pipeline terminal or at the refinery.

In these installations, they continued, the speed or discharge rate of the transfer pump will be directly regulated by the incoming production rate.

This will subsequently lead, they predicted, to the complete elimination of tankage for the transfer process.

To compensate for shrinkage, pipeline operators may then have to embark on comprehensive vapor-recovery programs, the two said.

They said such a system would make it feasible to undertake large-scale unitization, and automation of surface producing facilities.

Another likely trend will be the use of meters to record transfer data on punched cards or tape.

Kretzschmar and Smith said this development will permit use of automatic data-processing equipment to reduce accounting and billing costs.

Kentucky Plans Big Mapping Job

Work on an areal map of Kentucky is scheduled to start July 1, providing the U.S. Geological Survey contributes its share of the cost.

Under the plan outlined, the bedrock geology of the state will be mapped on a 7½-minute-quadrangle basis on a scale of 1 in. to 2,000 ft.

The mapping, said to be the first such program in the U.S., will be conducted on a cooperative basis, with USGS and Kentucky each paying half the total cost.

Cost of the mapping is estimated to be 46¢ per acre.

The $12-million program is expected to be completed in ten years.

The Kentucky legislature already has appropriated $900,000 for the work. Of this, $300,000 will be used the first year and $600,000 the second year.

USGS is now in the process of getting $300,000 to match the first-year allocation by Kentucky.

Approximately 30 geologists will be employed in the program.

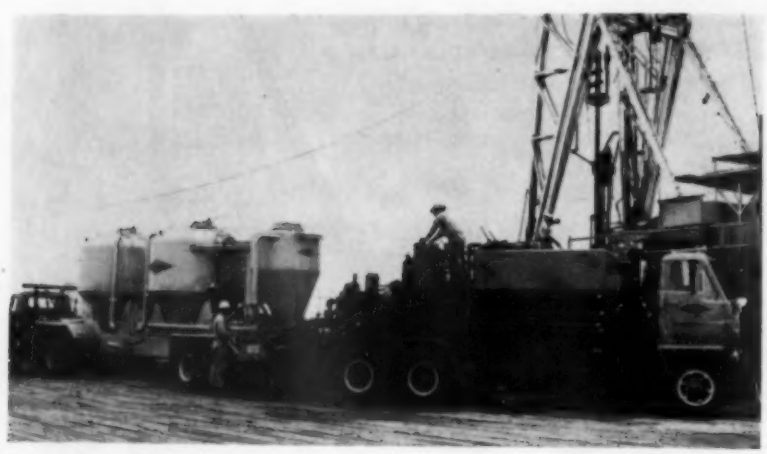
One-third of the counties in Kentucky have never been mapped in this manner.

In eastern Kentucky, 12 counties have never had areal geological maps made, and 9 have been only partially mapped.

Seven central counties and 12 western counties have not been mapped.

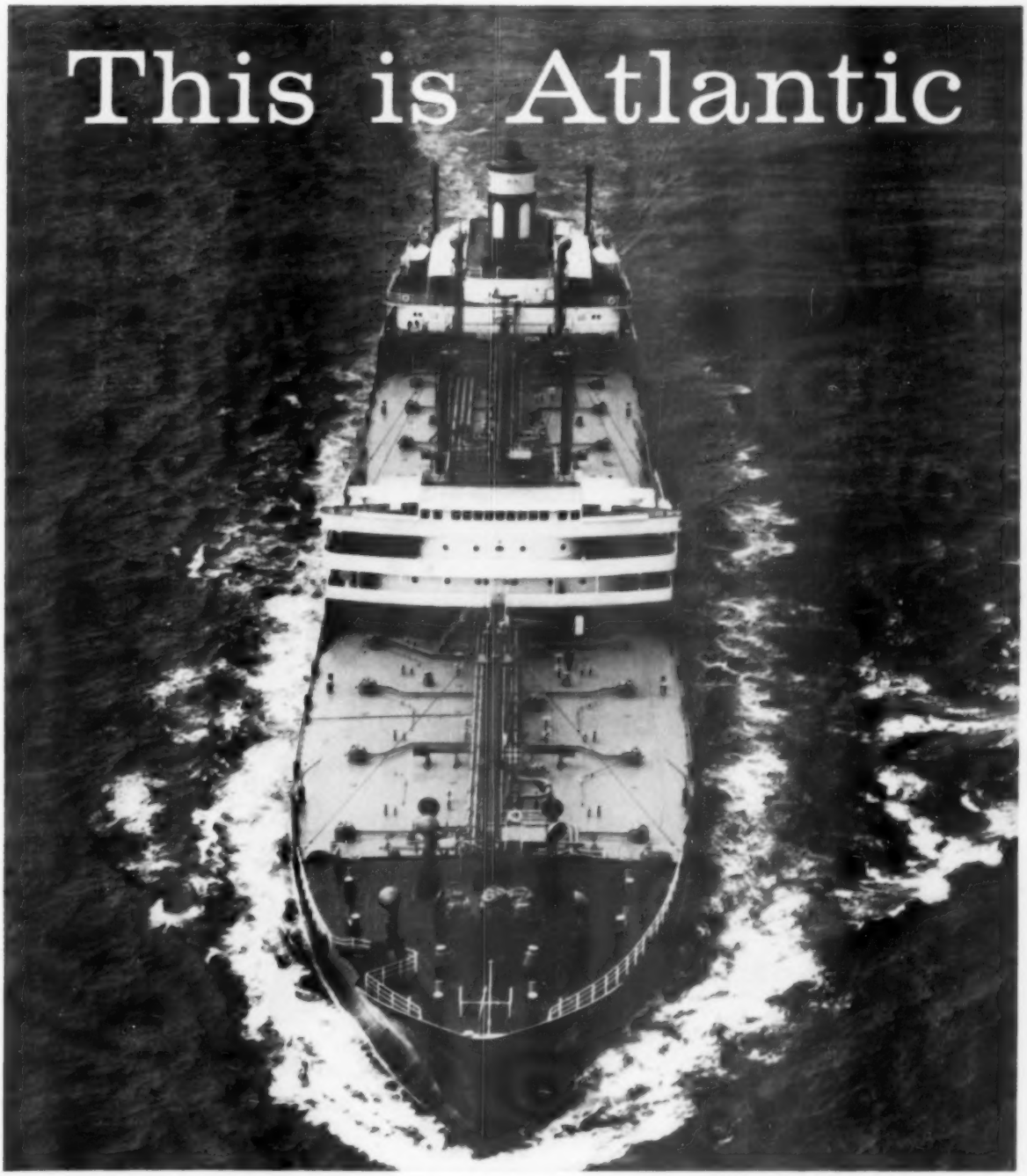
The remaining mapped areas, one-third of which are available in printed form, are on old bases, many of which are unsatisfactory, says Wallace W. Hagan, Kentucky Geological Survey Director.

Most of the maps, he said, were made in the early 1930s and late 1920s, and some date back to 1894.



Dowell Bulk Cement Units Go Into Service

Dowell division of Dow Chemical Co. has put these new cementing units into service in the Texas Gulf Coast area. Each cementing truck carries two pumps, each capable of handling 10 bbl. of slurry per minute. The bulk cement tanks on the transport have capacities of 300 sacks each.



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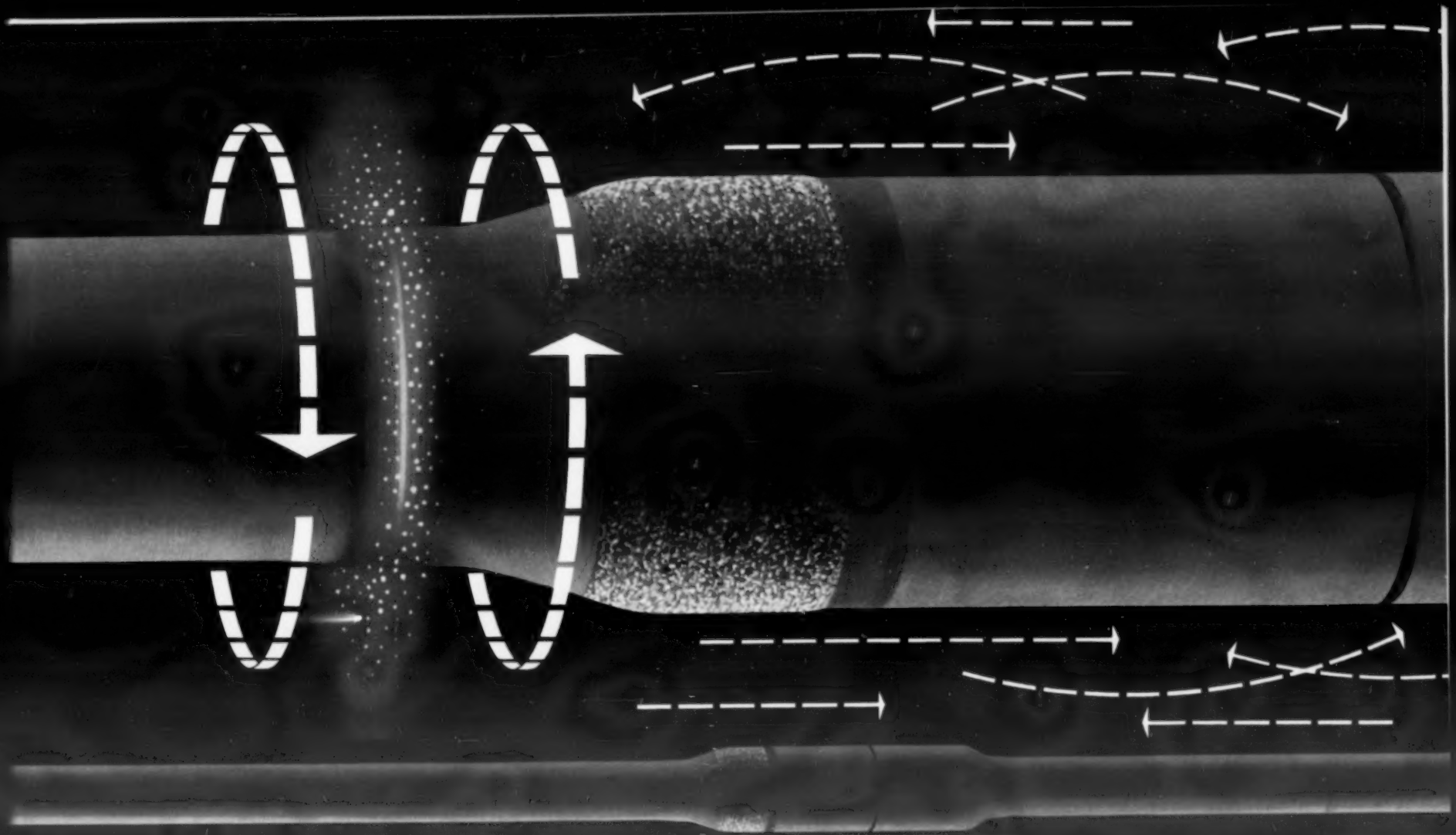

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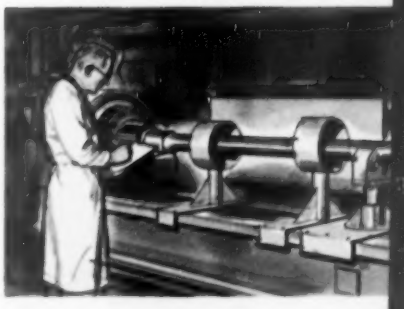

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GULF PRESS CONFERENCE **10**

A service of Gulf Oil Corporation in the cause of creating—through the facts as we see them —a fuller understanding of the oil industry.

Is $1 million a mile a fair price?

That's what you'll be paying, through your government, to build the new interstate highway system by 1976. Some $40 billion for 41,000 miles. It is probably history's greatest public works project. It will benefit the economy and promote national defense. But $40 billion is a lot of money. If the costs are not being fairly shared—and if your dollars' value is not being fully realized—you should know about it.

Q. Wasn't that $40 billion figure somewhat lower at the start?

A. Some $12.4 billion lower. The Federal-Aid Highway Act of 1956 asked $27.6 billion for 40,000 miles. Of this, 90% was to come from a Federal Highway Trust Fund, 10% from the States. But two years later the cost was $40 billion.

Q. That's a mighty big boost. What was the reason for it?

A. In some part, it was the addition of 1,000 miles of roadway. For the *most* part, however, it was the sharply raised cost estimates of the states through which the system passes. The states, you see, pay all costs, then seek a 90% repayment from the Trust Fund.

Q. Where, specifically, are all the dollars coming from?

A. Under the 1956 law, the federal gasoline tax covered 80% of the costs. Other road-user levies would make up the rest. But when Washington raised the gas tax from 3¢ to 4¢ a gallon last October, it *also* raised gasoline's share of the cost to about 85%. This percentage is to hold until the 1¢ boost ends June 30, 1961. Then, other vehicle levies will fill the gap. In short, the road user is footing the whole bill.

Q. Isn't that as it should be?

A. If the new system were meant simply as a motoring convenience, yes. But the highway bill was passed principally for its national defense and overall economic values. It will help the military move men and materials quickly. It will stimulate industrial complexes, lift land values, open up new tax sources. So it would seem defense and general funds should also help finance the highway project.

Q. Will the road-user taxes you mentioned cover the cost?

A. They could—with two big "ifs": first, *if* costs don't rise any more and second, *if* the road-user revenues are earmarked for the program.

Q. Let's look at the first "if." Is another cost rise likely?

A. The facts certainly suggest so. Remember that, only two years after the original estimates were computed, the costs had already risen by 45%.

Q. You suggest, then, that we're not getting good dollar value?

A. Some of us think not. Bureau of Public Roads officials have said that minimum BPR standards were being exceeded and that plush design may be adding to cost. And Virginia's Senator Harry F. Byrd wrote these words to the Secretary of Commerce, "On the basis of the kind of experience we have had with the interstate system to date, it is not difficult for me to foresee costs rising to a point in excess of $50 billion by 1975."

Q. You also suggested that all road-user revenues are not going to the highway fund. Isn't that true?

A. Unfortunately. In 1959, the federal government collected $3.6 billion in road-user taxes—mainly on gasoline. Of this, 39%—$1.4 billion—was turned over to Treasury's general fund. Some states also divert road tax revenues. In 27, constitutions forbid this. But in 1958, $303,326,000 was diverted. That's 6.5% of $4.7 billion taken in.

Q. If the taxpayer pays anyway, what's wrong with present financing?

A. It's unfair two ways. First, the road user—mainly the motorist—is paying for more than the roads. He's footing a huge bill for national defense and economic development which should be paid from other funds. Consider this: at the Defense Department's suggestion, bridges over the system are to be raised from 14 to 16 feet so that missile-carrying trucks can pass. This will add roughly $1 billion to the highway bill—but nothing to motoring convenience.

Q. And what do you see as the second wrong we face?

A. Present practices are pushing gasoline taxes—and thus, gas prices—unnecessarily high. They've caused two tax hikes already, 1¢ in 1956 and 1¢ in 1959. (Taxes now take nearly 50% of the pump price.) And Washington is now asking another ½¢. If all the road-user revenues had gone into the highway fund, last year's 1¢ rise in gasoline taxes wouldn't have been necessary.

Q. What do you think we should do to right these wrongs?

A. Simply be consistent. The government shouldn't have it both ways. If it's wrong to divert general funds to highways, it's also wrong to divert highway revenues to the general fund. We should bring defense and general funds into the program and earmark *all* road-user revenues for it. We must naturally see to it that no waste creeps in.

We welcome further questions and comment. Please address them to Gulf Oil Corp., Room 1300, Gulf Bldg., Pittsburgh 30, Pa.

What's New / IN EXPLORATION, DRILLING, PRODUCTION

Estimates are that secondary recovery programs at Utah's big Aneth pool will cost from $12-million to $14-million.

This was indicated during hearings before the Utah Oil & Gas Conservation Commission last week. The agency decided to consider the question of secondary recovery on Sept. 20.

The date was moved forward at the request of the Humble division of Humble Oil & Refining Co., which reported it was completing a unit for the McElmo Creek area. Humble estimates cost of the McElmo Creek unit secondary recovery at between $3-million and $4-million. Two more units may be formed.

•

The Texas Railroad Commission set a rehearing for June 22 to consider the question of revising the boundary between East and West Panhandle gas areas.

The commission so far has declined to change the boundary. The rehearing, to be held at Amarillo, will involve additional points of law covering rival applications.

West Panhandle field has over 2,000 wells developed on 640-acre spacing subject to proration. East Panhandle has 1,200 wells on 160-acre spacing and production at 25% of potential, substantially larger than quotas allowed for West Panhandle.

•

A federal agency figures there may be as much as 3.8-billion bbl. of oil in shale beds covering about 110 sq. mi. in northeast Utah.

The estimate is in a report, Geological Survey Bulletin 1072-0, prepared by the U. S. Geological Survey in cooperation with the Navy Office of Naval and Oil Shale Reserves.

The estimate is based on reports that oil shale in this area is 15-ft. thick or more, with an estimated yield of 15 gal. of oil per ton. The area comprises Naval Oil Shale Reserve No. 2, in Uintah and Carbon Counties.

•

A unitization project that will increase oil recovery by an estimated 40-million bbl., in University Block 9 (Wolfcamp) pool, Andrews County, West Texas, has been approved by the Texas Railroad Commission.

Atlantic Refining Co. and other operators plan to inject propane, natural gas and water into 4,000 acres of the Wolfcamp reservoir.

The commission also is considering a unit waterflood request by Three Bee Investment Co. for its Bryson Unit, East Bryson pool, Jack County. The operator predicts it will recover an additional 5.5-million bbl. of oil from the 1,823 productive acres in the unit.

•

A new well-stimulation technique, consisting of high-speed injection of a special slow-reacting acid, is reported yielding good results in the Permian Basin.

The method, developed by Dowell division of Dow Chemical Co., is said to extend the advantages of acidizing. The acid solution, which does not contain sand, is pumped into the formation at pressures capable of opening natural fissures in the rock, allowing the acid to penetrate "appreciable" distances from the well bore. The channels so formed are not blocked by propping agents.

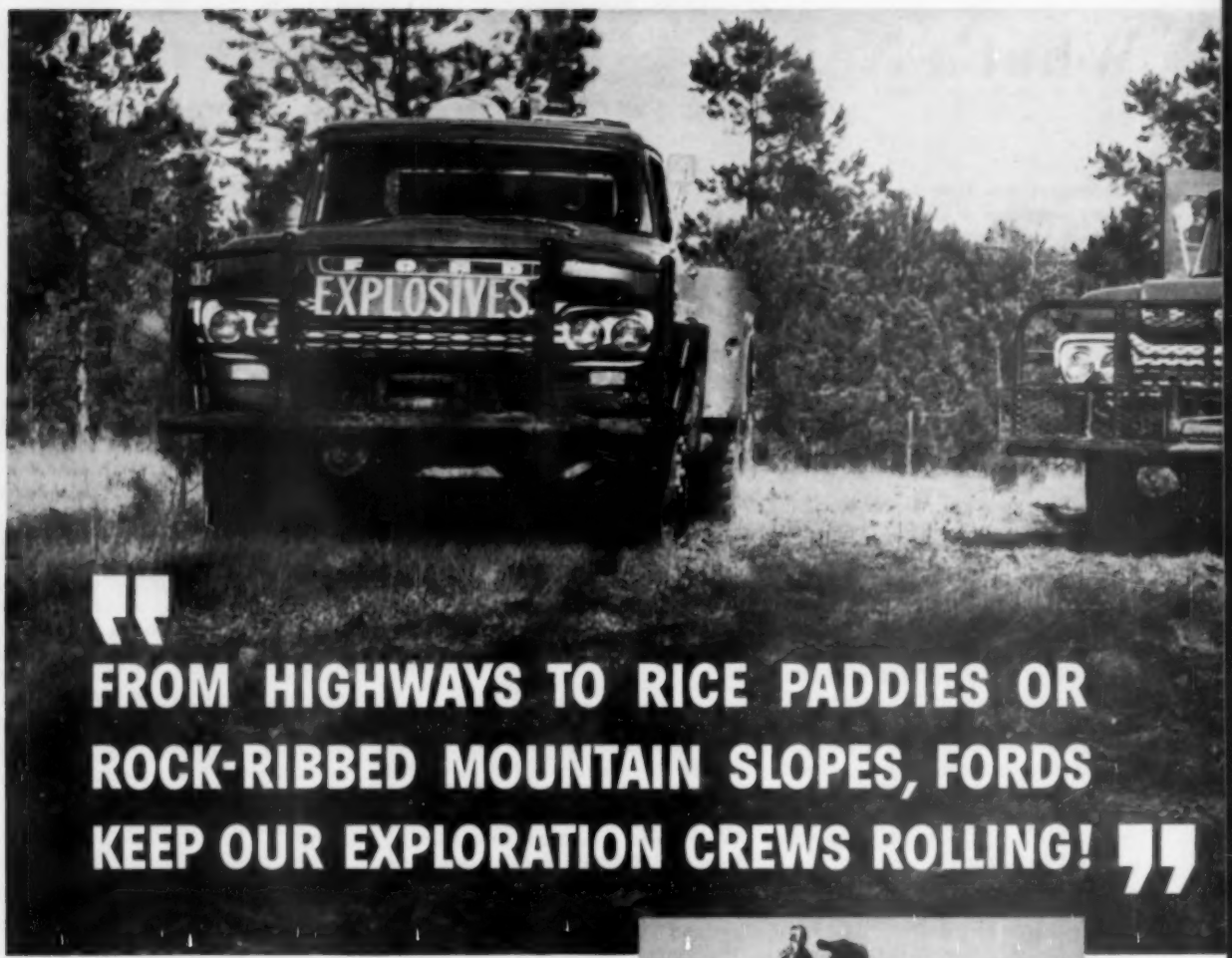
•

The 1960 California Oil & Gas Field map book is now available from Munger Oilgram, Los Angeles.

The company now is working on a series of Map Books that will even-

Office, Offshore Barge Float Down the Mississippi River

Shell Oil Co. floated this 100-ton office building (left) down the Mississippi River on a barge to its final location at Shell's Southwest Pass facilities. Divided into two sections, which will be joined to make one building, the structure contains 12 oak-panelled offices. The 100-ton building was built by Metal Building Products Co. in New Orleans. The S-66 offshore drilling barge (right) is shown on test in the main yard of Avondale Marine Ways, Inc., New Orleans, builder of the unit. The barge was then moved down the Mississippi River to a location 25 mi. offshore, west of Grand Isle, La., for tests which began last week. The California Co. will use the big barge for drilling in waters to 100 ft. deep.



"FROM HIGHWAYS TO RICE PADDIES OR ROCK-RIBBED MOUNTAIN SLOPES, FORDS KEEP OUR EXPLORATION CREWS ROLLING!"

says Jack McManus
Equipment Manager
Geophysical Service Inc.
Dallas, Texas

Surveying with radar, this GSI surveyor uses a "Tellurometer" mounted on a special platform over the Ford F-250's cab. This new electronic, line-of-sight device is used for long survey traverses for seismic operations in West Texas and similar areas of the world. Elevated above the brush, a 10- to 15-mile line can be accurately surveyed from a single setup.

"Our world-wide oil exploration operations are often similar to those of an army task force . . . only we have to show a profit. In remote areas logistics is of prime importance. If replacement parts and supplies are not immediately available, the need for a bolt or a bearing may hold up an operation and cost thousands of dollars in lost time. Under these conditions, inherent vehicle ruggedness, ease of maintenance and parts availability are 'musts' for keeping our seismic crews in operation.

"We have 138 Ford Trucks from ½-ton pickups to F-800 Heavy Duties. These Fords, many of which are 1960 models, are used for party chief vehicles, recording, water, shooting, drill, survey, transportation, utility and gravity meter trucks.

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The Falcon Ranchero is priced lower than any pickup in America with comparable standard equipment! And that is just the beginning of your savings. Single-unit construction saves on maintenance . . . it's tighter, quieter, with main underbody structural members zinc-coated against rust and corrosion. Front fenders bolt on, cost less to replace. And Ranchero's passenger-car ride and handling ease lessen driver fatigue.

UP TO 30 MPG!

Totally new for *total* savings! Ford's new Falcon Ranchero delivers up to 30 miles on a gallon, yet its new 90-hp Six is geared to do a real job! There's lower costs for oil, tires, brakes, replacement parts . . . nearly everything!

BIG 6-FOOT BOX!

Capacity is more than ample for most pickup hauls—nearly 8 feet of load length with tailgate flat. And thanks to the low floor height, loading and unloading is faster, easier!

FEATURES:

1. Up to 30 miles on a single gallon
2. 4,000 miles between oil changes
3. Diamond Lustre Finish needs no waxing
4. Low loading height
5. Instant-lock tailgate opens, closes with a single, one-hand motion
6. Roomy comfort for three adults
7. Styled to capture admiration

*Based on a comparison of latest available manufacturers' suggested retail delivered prices with comparable standard equipment

See the parade of pickups during your FORD DEALER'S TRADING FAIR

tually cover the world. The first will include geological data, oil and gas fields, concessions, and pipelines in Africa and the Middle East.

•

Island Oil Co. has acquired 18 North Texas producing wells for $725,000.

Sellers were O. P. Leonard and William White, both of Ft. Worth. The properties are on G. W. Higgins land in Bomarton pool, Baylor County. Island Oil is owned by Neville G. Penrose, Ft. Worth.

•

Marmon-Herrington Co., Indianapolis, has acquired more than 80% of the voting stock of Flash Perforation Co., Abiline, Tex.

Flash engages in servicing of oil and gas wells, radioactive logging, perforating, and wireline servicing.

•

Continental-Emsco Co. has purchased Win-Well Mfg. Co., Tulsa.

The purchase includes patents, inventory, jigs, and fixtures for production of the Win-Well Rotary Selector Valve, to be known now as the Win-Well Green Triangle Rotary Selector Valve.

•

A proposal to produce 11.5-million bbl. of synthetic crude and other products annually from the Athabasca oil sands will be considered June 8 by the Alberta Oil & Conservation Board.

The application was submitted by Great Canadian Oil Sands Ltd. The project would be in lease No. 4, 92-10W4.

•

Engineering

A portable Viscometer with a hand-cranked drive has been developed by Fann Instrument Corp., Houston.

The instrument is said to be ideal for field service because it eliminates need for bulk storage batteries and power packs.

•

Drilling Highlights

Texas Panhandle—Gulf Oil Corp. No. 1 Bowers, section 255, block C, G&MMB&A survey, Hemphill County, flowed gas at rates of 1.5-million cf/d to 5-million cf/d through chokes of 6/64-in. and 14/64-in. Production was through 2⅜-in. tubing run to 11,365 ft. inside drillpipe, which was cemented in the hole. Packer was set at 11,346 ft. Drilling difficulties prevented identification of the pay, believed to be lower Pennsylvanian. The well is more than 25 mi. northeast of Red Deer Creek field.

New Mexico—Ohio Oil Co. No. 1 Andrew Arnquist-State, section 29-18s-26e, Eddy County, made an absolute open flow of 545-million cf/d of gas; gas-condensate ratio was 100,000:1. Production is through perforations at 9,060-84 ft. and 9,902-120 ft. in the Bend (Pennsylvanian). The big producer is ½ mi. northwest of Ohio's No. 1 Nix, gas-condensate producer completed in the area late in 1959.

Wyoming—True Oil Co. No. 1-D Mary, section 28-52n-69w, Campbell County, recovered 610 ft. of 21-gravity oil and 95 ft. of oil-cut mud on 3-hour drillstem test of the Minnelusa (Pennsylvanian) at 7,574-89 ft. The prospect is 8 mi. southeast of Mitchell Creek pool.

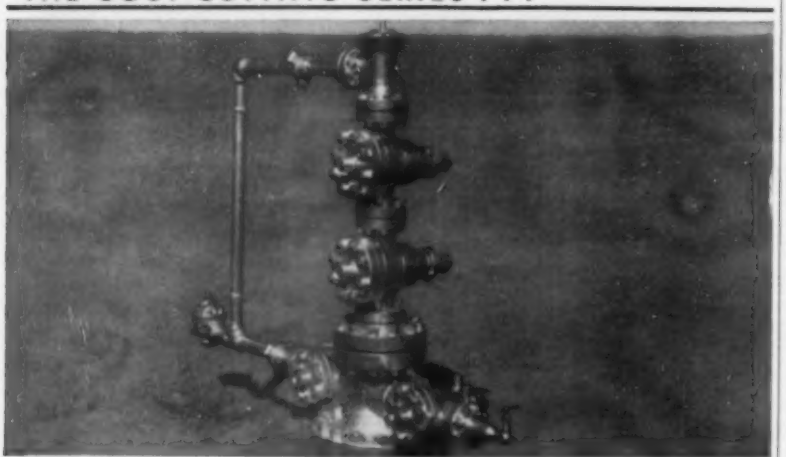
Utah—Texaco Inc. No. 1 Fence Canyon Unit, section 36-15s-22e, Uintah County, flowed 5.2-million cf/d of gas from the Buckhorn (lower Dakota) through perforations at 8,544 ft., 8,566 ft., and 8,580 ft. The discovery is 9 mi. north of Diamond Ridge Unit gas field.

California—Great Basins Petroleum Co. No. 66-23, section 23-2s-6e, San Joaquin County, flowed 3.2-million cf/d of gas through ½-in. choke and perforations at 5,925-45 ft. and 5,957-70 ft. in the Tracy. The discovery is 5 mi. north of Vernalis gas field.

Kansas—Tennessee Gas Transmission Co. No. 1 Bargrover, section 26-27-24w, Ford County, was completed for 248 b/d of 38.2-gravity oil through perforations at 4,847-83 ft. in the Marmaton. The discovery is 12 mi. southwest of Konda pool.

West Texas—G. Scott Hammonds No. 1 Foster, labor 8, league 305, Dawson County school land survey, Gaines County, was completed for 430 b/d of oil, based on 12-hour flow through ⅜-in. choke and perforations at 9,201-18 ft. in an upper Wolfcamp zone. Operator is now testing for duel completion in the lower Wolfcamp through perforations at 9,406-22 ft. and 9,479-89 ft. The opener is 1-mi. southeast of Toby Jo pool, and separated by failures.

THE COST CUTTING SERIES . . .



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A typical Christmas tree (above) controlled by Rockwell-Nordstrom lubricated plug valves stands in an extremely remote desert location. Yet it operates instantly even after standing untouched for many months. Instant operation is insured by the "hydraulically seated" tapered plug . . . and the lubricant creates a powerful double seal against leakage. Petroleum producers have found that lubricated plug valves prove best for such applications. The lubricant "seat" can be quickly, easily repacked under full operating pressure with the valve in any operating position. For complete information on Rockwell-Nordstrom valves and valve accessories, write:

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there's more to Cities Service than meets the eye!

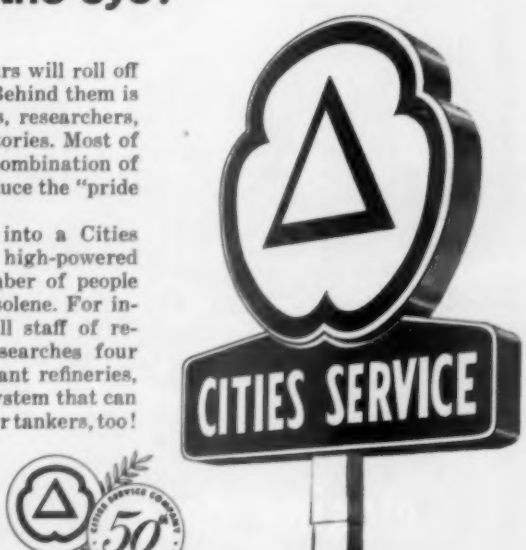
Designers and engineers work years ahead of actual production. Designers work directly with decorators and metal craftsmen to select new materials which can aid them in working out advanced designs.

More than seven million new cars will roll off the production lines this year. Behind them is a complex network of designers, researchers, test drivers, and testing laboratories. Most of us fail to realize the enormous combination of people and tasks it takes to produce the "pride of the family."

Likewise, motorists pulling into a Cities Service station in their new, high-powered cars don't realize the vast number of people and jobs it takes to produce gasolene. For instance, Cities Service has a full staff of research and technical experts, searches four continents for oil, maintains giant refineries, research labs, uses a pipe-line system that can circle the globe and a fleet of super tankers, too!

And Cities Service has spent over a billion dollars in product development.

Only in this way can America have what it needs for progress—more jobs and more and better oil products.



Petroleum Week's June 24th Production Special Report will focus on cutting costs and increasing efficiency in petroleum and natural gas producing operations . . . multiple and tubingless completions, secondary recovery methods, lease automation, and computer applications in gas and oil production.

However, in addition to surveying and discussing the entire field of cost-cutting, efficiency-increasing equipment, materials and techniques, the report will cover also the economic, political and administrative factors bearing on producers' profit problems . . . supply-demand, imports, proration, and gas growth.

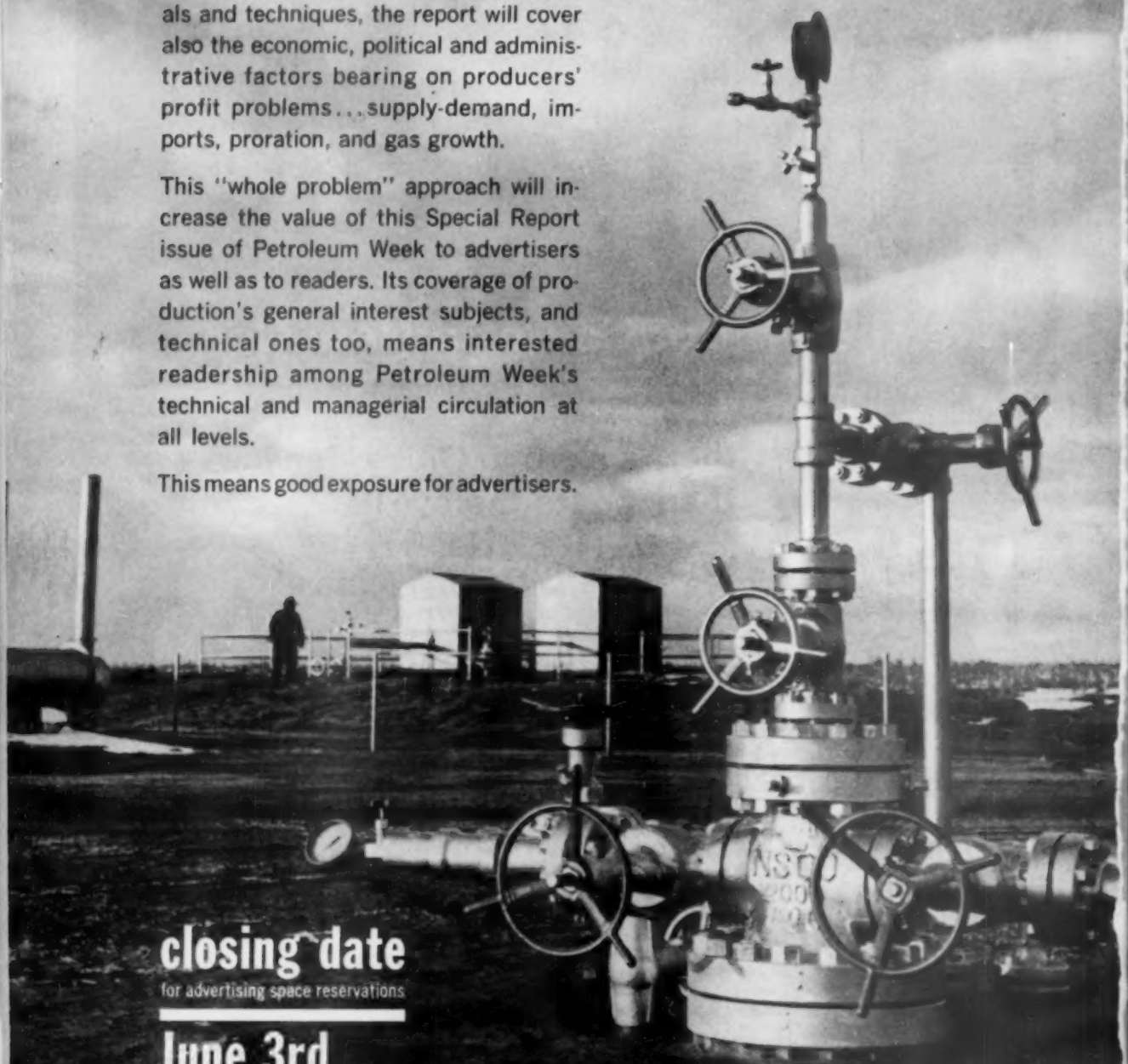
This "whole problem" approach will increase the value of this Special Report issue of Petroleum Week to advertisers as well as to readers. Its coverage of production's general interest subjects, and technical ones too, means interested readership among Petroleum Week's technical and managerial circulation at all levels.

This means good exposure for advertisers.

special report

PRODUCTION

June 24th PETROLEUM WEEK



closing date
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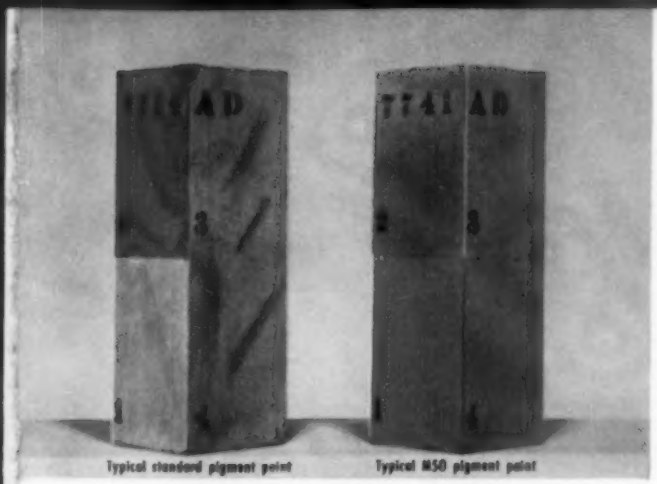
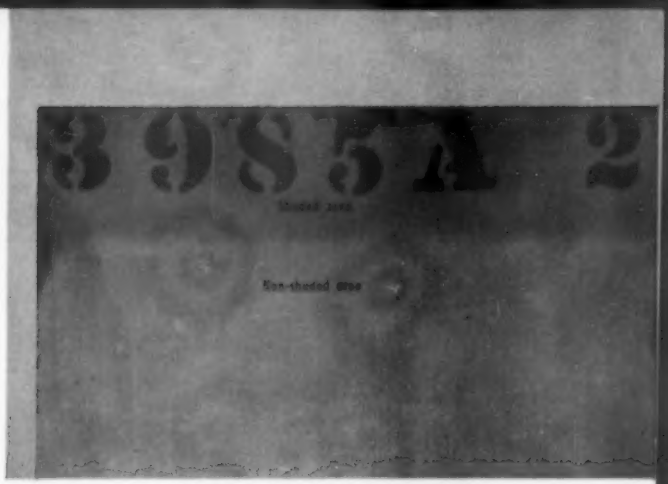
June 3rd



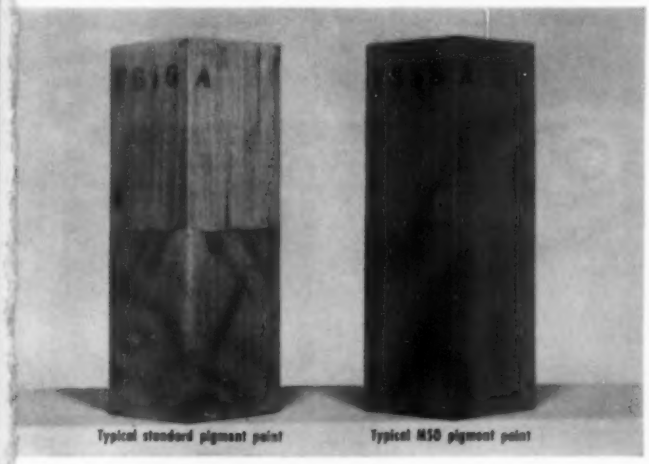
No objectionable whitening from chalking

Contrast these two exposure test panels . . . both show comparable metal finish paints. Same original colors. Same exposure (45° South, 2 yrs., 3 mos.). Notice bright color of *M50* paint, freedom from chalk.



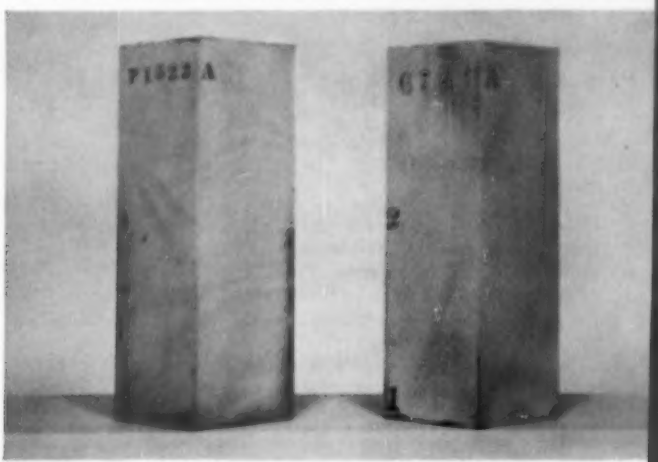
No appreciable fading from light action

Now look at this 9-year exposure test panel of an *M50* paint. Contrast area shaded by wooden panel holder with non-shaded area. Clearly, there has been practically no fading in this 9-year period.



No leaching from water action

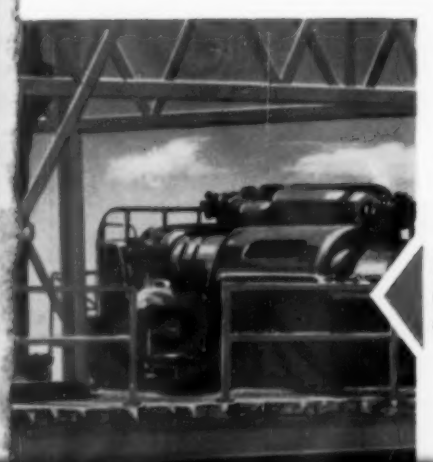
Examine the exposure panel at left. Notice the vertical brushmarks? Rain water leaching of the top coat permits brushmarks in undercoat to show through. In the panel at right, insoluble *M50* pigment prevents this film failure. Exposure 45° South, 2 yrs., 7 mos.



No discoloration in industrial atmosphere

Here are two exposure panels painted from the same can of *M50* paint. Both have been exposed 4 years, 45° South. The right one in normal atmosphere, the other in sulfur-laden industrial atmosphere. Notice no color difference has developed. No bilging.

Proof you get unique color stability in metal protective paints made with M50® pigment



Drilling equipment looks better, needs less maintenance painting when painted with colorful *M50* anti-corrosion paints.

No need to amplify what the four illustrations above show. Plainly, *M50* basic lead silico chromate pigment permits your paint supplier to make paints with more color stability than ever before available in anti-corrosion paints . . . primers as well as finishes.

National Lead exposure tests demonstrate that these paints . . . both standard and deep-coat . . . also provide better and longer lasting anti-corrosion action, and never-before weather resistance. Some of the opportunities these new *M50* paints present are suggested on the following page. You'll think of others.

M50 an **oncor** *pigment development of*

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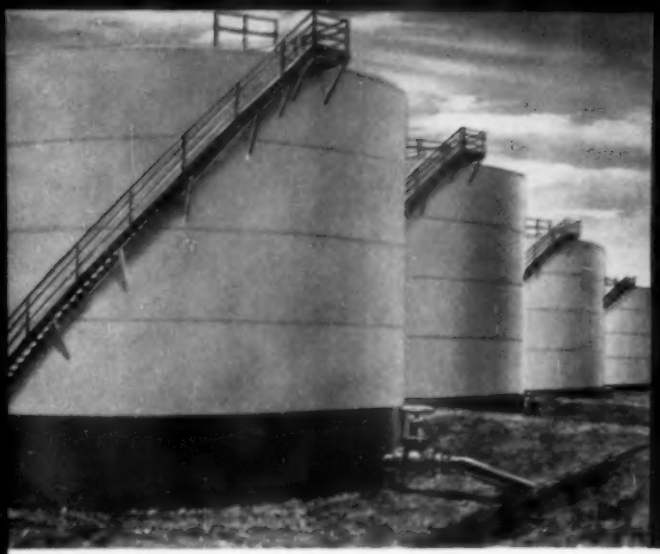


Public relations.
Attractive tank farms that *stay* attractive longer.

Product identification.
Color-coded drums that *stay* colorful longer.

Two ways to make good use of the superior color stability of M50 pigment anti-corrosion paints

Before the advent of *M50* pigment, those responsible for maintenance painting had to make a choice between colorful appearance and long-lasting corrosion protection.

With *M50* pigment paints, exposure experience proves, this compromise is no longer necessary. *M50* paints have weather resistance . . . stay bright and colorful . . . and *at the same time* provide superior corrosion protection. With these unusual paints, color stability problems . . . leaching, fading, whitening, darkening from bilging . . . are eliminated. Now, with *M50* paints, you can have maximum anti-corrosion, maximum durability and, at the same time, long-lasting good appearance.

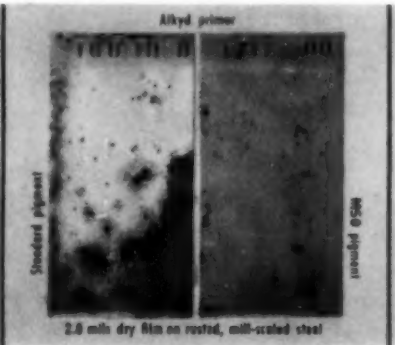
The illustrations above suggest two areas in which the combination of superior anti-corrosion action and superior color stability found in *M50* pigment paints can pay off handsomely. Note that in both, service is severe and colorful colors are needed. With *M50* paints, you repaint less often.

In your own operations there are bound to be many similar applications where specification of *M50* paints can lower your maintenance painting costs. Ask your regular paint supplier to make up suitable *M50* paints for your requirements.

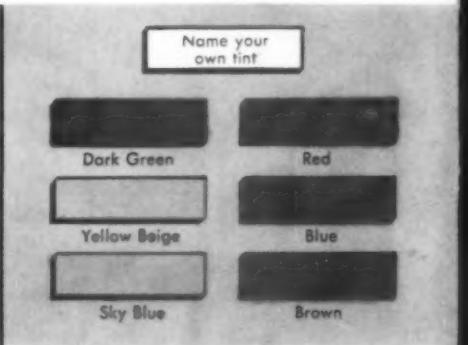
Why M50 Defense in Depth paints give anti-corrosion beyond all former concepts

2 standard pigment alkyd primer coats
1 standard pigment alkyd primer coat
Gray Alkyd Finish Coat
2 M50 pigment alkyd primer coats
1 M50 pigment alkyd primer coat

Exposed 9 years, 45°S. Each coat 1.5 mils
Proved corrosion and weather resistance



Exposed 45° S, 1 yr ind. atmos., 1 yr normal atmos.
Proved outstanding for film strength, durability



Colors above available in conventional and heavy-coat paints
A wide range of stable colors can be produced

Are you concerned with tank or structure maintenance painting in your firm? If so, you are invited: (1) to visit National Lead's Sayville, L.I. test station, where you will see the results of the 20 years research that lies behind the *M50* pigment particle and the more than 10 years of exposure testing that lies behind *M50* pigment Defense in Depth paints; (2) to send coupon below for National Lead booklet, "Defense in Depth" and typical *M50* tank paint specifications.

Next time you purchase, specify *M50* pigment paints. Any paint manufacturer can supply you.

M50 Defense in Depth

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Gentlemen: Please send me the "Defense in Depth" booklet together with typical tank paint formulas and color chips that I can use in specifying M50-type tank paints.

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Startups and Shutdowns are Touchy

Startup and shutdown procedures in refineries are being given increasing attention, because the larger sizes and capacities of modern refinery units have made these operations more delicate.

An entire session of last week's mid-year meeting of the API Division of Refining, in Detroit, was devoted to these procedures.

Substantially identical precautions were referred to by all the engineers who described the procedures adopted by their companies. But various degrees of importance were given to specific points of these procedures, according to each spokesman's experience with various types and sizes of units.

Certain recommendations are basic in all cases. These are, essentially:

- Startup and shutdown operations must proceed slowly, and pressures and temperatures must be checked continually.
- Moisture must be eliminated completely from the equipment before introducing hot oil.
- All air must be removed from a unit before any hydrocarbons are admitted.
- Fireboxes must be purged before starting the burners, and gas fuel must be used for the start.
- Corrosive or poisonous materials—acids, salts, caustics, sludges, hydrogen sulfide or fluoride—must be completely removed.
- Pyrophoric iron sulfide, if present, must be drenched with light oil and removed when opening a unit.

The total time elapsed between the preparation for a startup and the cutting of products to the field is 36 to 48 hours for the large crude still of Gulf Oil Corp.

Gulf's atmospheric and vacuum distillation unit at Port Arthur, Tex., has a capacity of 120,000 b/d. The refinery is integrated to a great extent, so that products from the big still are run either directly to subsequent units or to charge tanks for these units.

Gulf engineers W. S. Bonnell and J. A. Burns described the steps that are being followed for startup and shutdown operations.

To start up:

- The unit is purged completely of air, tested, and blown substantially free of water prior to the startup. This is done with steam and gas.
- Controlled recirculation of crude is slowly established through both the atmospheric and the vacuum sections, with towers maintained under slight, controlled gas pressure.
- The atmospheric section is then fired, brought over, and lined up, with recirculation of products. When the reduced crude approaches proper composition, the vacuum section is fired, brought over, and lined up, with recirculation of products.
- Stripping steam is started to the towers.
- The unit is cut to the field by switching the product flow from the recirculation line to the regular products lines at the product manifold.
- Crude charge, which was started very slowly and maintained at a rate of 50,000 b/d during the adjustments, is gradually increased to 120,000 b/d.

For shutdown operations, which take about 24 hours, the reverse procedure is followed.

Since the unit is cut to the field with the unit lined up and products on test, downstream processing units are not substantially affected, and continuity of operations can easily be maintained.

Conversely, Gulf said, if serious trouble should occur to a downstream unit, the crude unit could be put on recirculation in 2 to 3 hours, and returned to normal operation in a short time.

Standard Oil Co. (Ind.), which operates the largest crude still—140,000 b/d—at its Whiting refinery, emphasizes the importance of specific written procedure instructions for "ups" and "downs."

Indiana engineers A. H. Hayes and R. M. Melaven described their company's "check-off system," in which the exact condition of the unit is recorded all the time, and reports are initialed by the operators.

They illustrated the importance of their startup and shutdown precautions by pointing out the serious accidents that have occurred in the industry in recent years when these procedures were not scrupulously followed (PW—Nov.13'59,p87).

The most critical components of refinery units are the vacuum towers, according to Standard Oil Co. (Ohio).

R. W. Ballmer, of Sohio, explained that the new distillation units at the Cleveland refinery—capacity, 45,000 b/d—are manned by experienced operators, especially trained, and with adequate startup procedures carefully prepared in advance. Yet, he said, "the Achilles heel of the new units seems to be the vacuum towers." Trays in these towers have been upset by internal explosions.

The problem is apparently related to moisture in inaccessible parts of the towers.

Today, Ballmer said, the vacuum towers are flushed with dry, superheated steam, followed by heavy gas oil.

It takes at least 18 hours to bring the distillation unit to normal operation, he said.

And the shutdown operation must also be accomplished very slowly—about 18 hours—to avoid exposing tower internals to cold water and air too soon.

Ballmer also emphasized the importance Sohio puts on the use of check lists for putting distillation units on stream.

'Cat' Gets Preheater

The 1,000-lb. cold-end component of a Ljungstrom air preheater is being installed in the furnace of the largest cat cracker at Esso Standard's Bayway (N. J.) refinery. The preheater, which operates on a continuous regenerative counterflow principle, will preheat combustion air by recovering heat from the furnace's exit gases. Air Preheater Corp., manufacturer of the unit, says the equipment will reduce fuel costs.

Army Tests 'Compromise' Diesel Fuel

A mixture of gasoline and distillate —instead of distillate alone—may become the major fuel for U.S. military diesel engines within the next decade.

That prediction was made last week by Errol J. Gay, consultant to the U.S. Dept. of Defense, at the power fuel session of the midyear meeting of the API Division of Refining, in Detroit.

It is based on the recent interest shown by the Army in the use of multifuel compression-ignition (diesel) engines over a wide range of power outputs.

Advantage of such a fuel would be to stretch the "middle of the barrel," thus easing the demand for distillates, and yet permitting the Army to take advantage of the greatly improved fuel economy of compression-ignition engines.

"The demand on distillates would be enormous in case of war," said Gay. "There can be two ways of relieving it. One would be to operate the Army compression-ignition engines on gasoline. The other would be to arrive at a compromise compression-ignition fuel, made up of a mixture of gasoline and distillate. This is necessary because, while the Army could operate all of its equipment on gasoline, neither the Air Force nor the Navy can adapt its modern equipment to the use of motor gasoline."

A great deal of effort has been spent on the development of diesel-type engines—particularly in small sizes—capable of burning gasoline (PW—Jun.26'59,p37). The French Petroleum Institute has contributed a great deal to this development. And Continental Motors Corp. has adapted the principle of the German MAN engine to its "Whisper" engine.

But there are disadvantages:

- The supply of a sufficient quantity of gasoline to give required combat range presents a difficult problem of logistics.
- There is a power loss of 10% to 30% when compression-ignition engines burn gasoline instead of diesel fuel.
- Highly aromatic gasolines are unsatisfactory in these engines at light loads, when starting in cold weather, and when idling.
- A special gasoline—MIL G-3056, type C—must be used in cold weather.

Therefore compression-ignition engines burning gasoline are not attractive for the range of power above 250 hp.

The "compromise" compression-ignition fuel which is being tested now shows great promise over the entire range of military engines.

Continental Motors Corp., Caterpillar Tractor Co., and the Detroit Diesel Division of General Motors Corp. have all come out with multifuel engines rated on the new Army compression-ignition fuel. These engines range in power from 350 to above 750 hp. They can also, in case of emergency, use normal diesel fuels, jet fuels (with cetane number above 30), and even gasoline mixed with a little lubricating oil.

The fuel is a blend of gasoline and distillate with a boiling range from 130F to 527F.

Specification MIL-F-45121-A requires that the fuel have a cetane number between 35 and 40, a freezing point below —67F, a maximum of 0.5% of sulfur, and less than 25% of aromatics.

It is at present being tested by the ordnance laboratory of Southwest Research Institute. The tests are scheduled to be completed by late 1960.

This fuel can also be used for the gas turbines in Army equipment, says Gay, thus relieving the demand on jet fuels for that purpose.

For keeping tabs on corrosion . . .

Probes Are Useful Though Limited

Electrical-resistance probes, now generally accepted in refineries as a tool for monitoring the corrosivity of process streams, may actually be misleading if their readings are not properly interpreted, according to an API subcommittee.

The corrosion-probe method is based on the fact that when a current passes through a piece of metal exposed to a stream of corrosive liquid, the electrical resistance of the current increases as the cross-section of the metal —or probe—is reduced by corrosion.

The resistance reading can be processed in an electronic instrument to supply a direct value of corrosion rate, expressed in micro-inches.

A panel of the Subcommittee on Corrosion of the American Petroleum Institute conducted a survey of the experience of refiners with corrosion probes. This week Andrew Dravnicks, engineer of Standard Oil Co. (Ind.) and a member of the panel, reported the results of that survey at the midyear meeting of the API Division of Refining, in Detroit.

Probes have found applications in almost every type of process. But the greatest number are used in crude distillation units.

There they are used principally in the overhead system of the primary tower, where corrosion is severe.

They are also used extensively:

- In vapor recovery units (mostly on depropanizers and debutanizers);
- In catalytic reforming and cracking units;
- In practically every part of the refinery water system;
- In petrochemical manufacturing units.

Unfortunately probes cannot always be trusted to represent the correct rate of corrosion of the equipment in which they are installed, the survey revealed.

The absolute value of corrosion wear may differ widely between the probes and the metal of the equipment which they are supposed to duplicate.

These differences may be attributed to many reasons:

- The location of the probes may not be representative of the conditions of the wall of the equipment.
- The temperature and the velocity of the stream acting upon the probes may be different.
- Pitting, cracking, or intergranular corrosion of the probes may modify the readings.
- Metallurgical effects, such as gradual annealing of the probes, may throw the readings off.
- There may also be a formation of deposits, such as oxidants, on the probes, making them ineffective—or inaccurate.

One-fourth of the refineries surveyed by the API group had recorded

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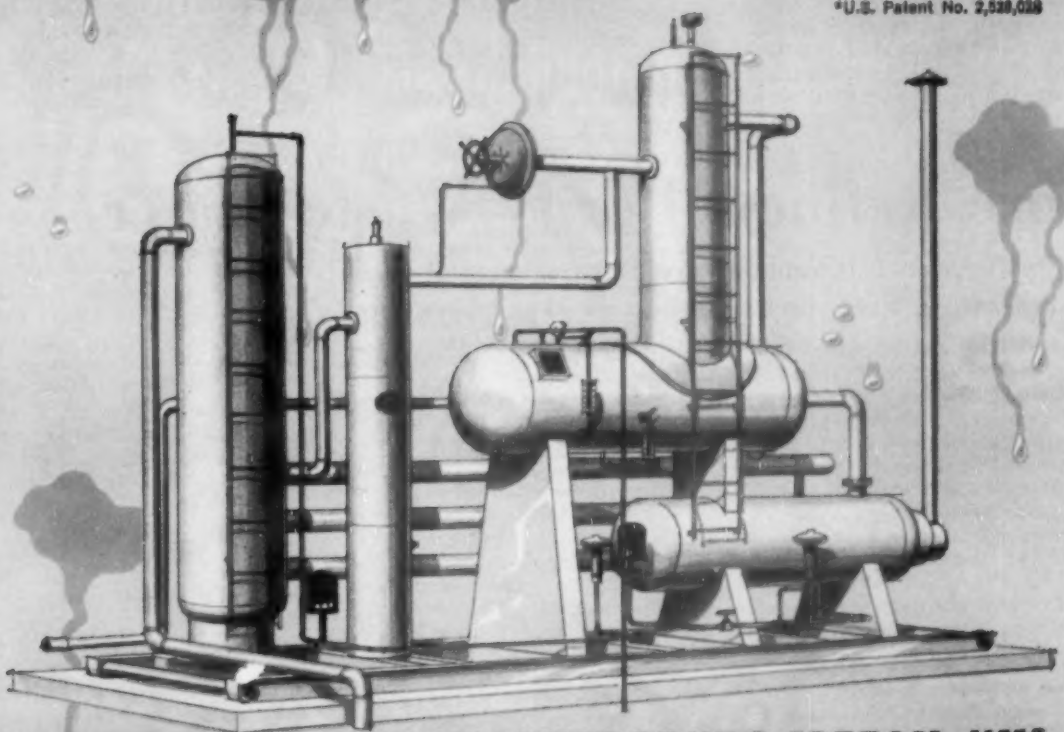
*U.S. Patent No. 2,528,028



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probe data that were known to be in conflict with other evidence.

A safety aspect also enters the picture, according to the survey. The use of electrical-resistance probes, and especially of retractable probes, was shown to be unsafe in certain locations of many refineries.

The probes' limitations, however, do not detract from the value of the probe method. Among its advantages is the fact that probes can be used at high temperatures and high pressures —although the majority reported seem to remain under a limit of 450F. Retractable probes must be equipped with some locking device to prevent their expulsion when used in high-pressure vessels, the survey indicated.

It is often convenient, the survey showed, to centralize the readings of the probe system in one control room.

The sensitivity of the probe system is very high, and it is therefore well-suited to detect changes in corrosion rates.

Detection of 1 or 2 microinches of corrosion is commonplace, the survey indicated. With such a sensitivity, a corrosion rate as low as 0.005 in. per year may be detected from measurements taken only a few hours apart, said Dravnieks.

Measurements are dependable only until the cross-section of the probe is reduced by 20% or 30%. Therefore, for long tests, either thick probes or thin retractable probes must be used.

And because the probe can be read as often as desired, the method is particularly adaptable to the detection of changes in the rate of corrosion of the unit.

The secret of successful utilization of probes lies in a careful study of their location and number, the frequency of the probe readings, and a good interpretation of these readings, the API group reported.

This interpretation is generally made by the refinery personnel most directly concerned with corrosion, according to the survey. In certain cases, a "probe pool," collecting and studying the data of several refineries of the same company, seems to be advantageous.

To facilitate the future use of probes, it may be desirable to equip new refinery units with standardized types of probe-entrances.

More than 60% of the refiners in the survey favored the standardization of probe entrances. About as many were in favor of retractable probes with specially designed gate valves.

More Refiners Purify Waste Water

Public safety is behind the spreading treatment of refinery wastes. When discharged into rivers and bays, they must be made safe for fish—and even for people.

Treatment of waste water is given great emphasis in oil refineries today. The purpose of the treatment is to remove—and recover—a substantial amount of oil, and to make the treated water safe enough to be discharged into rivers, ponds, or bays.

Different degrees of safety are aimed for. When fish have to be protected, or when the water may be used for drinking purposes, the treatment must obviously be more severe.

Three such water treatment installations were described this week at the API Refining Division meeting, in Detroit: one that is being built in Philadelphia for Atlantic Refining Co.; one that has been in operation for over a year at Texaco Inc.'s Puget Sound refinery; and one that has been in operation for a year for Cities Service Oil Co. Ltd., in Trafalgar, Ont. (PW—Jun.19'59p76).

Atlantic Refining Co.'s installation will treat both industrial and sanitary wastes, in a two-stage process combining API oil-separation and air flotation.

Atlantic's engineers E. R. Roth, J. D. Helwig, and W. A. Hall described the Philadelphia plant at the API meeting.

The Philadelphia refinery is divided into three parts by a major city street and the Schuylkill River. Waste disposal in each part is handled separately:

- The West Yard has only a separator and an automatic backwash sand filter. It treats an average of 20 gal. per minute of tank-bottom water.
- The North Yard has a two-stage treatment plant, consisting of gravity separation, chemical flocculation, filtration, and incineration of the solids. It handles 13-million gal. per day.
- The South Yard plant heretofore consisted only of gravity oil separators. The new plant now under construction was designed after extensive pilot-plant tests.

The problem was to select a size of plant capable of handling high flow rates during storms, with acceptable discharge characteristics.

An examination of the flow records indicated that the minimum daily flow of waste water is 2.5-million gal., with a maximum of 7.5-million gal. one day out of 100. The median flow rate is 4.7-million gal. per day.

To decide on the flow-handling capacity of the new plant, considerations had to be given to what is referred to as a one-year storm and also a ten-year storm. A one-year storm is the maximum rainfall during any one-hour period which is not exceeded more than once in a year. This was found to be a rate of 32-million gal. per day. A similar definition for a ten-year storm provided a figure of 50-million gal. per day. Considerations had also to be given to eventual expansion of the refinery.

Taking all these factors into account, Atlantic decided to build a plant capable of handling normally 8.8-million gal. per day. During heavy storms, a quantity of water corresponding to the one-year-storm figure—32-million gal. per day—will be given partial treatment in both the oil separation stage and the air flotation stage, but at reduced efficiency.

For quantities of water which may, very unfrequently, exceed that figure, partial treatment would be given in the oil separation plant for removal of any gross oil content. But beyond that, the excessive storm water would be bypassed directly into the outlet sewer, where it would be diluted with the discharge from the treatment plant.

The net result is a plant that can process water in times of heavy storms, yet not be greatly overdesigned for normal weather conditions.

Oil removal is accomplished first in a preseparator and an API separator.

The preseparator is designed so that the water remains in it for a minimum of four minutes.

It is tightly enclosed, and an atmosphere of inert gas blankets it for safety purposes. Atlantic estimates that 40 b/d of hydrocarbon gases can thus be prevented from being lost by evaporation into the air.

The API separator removes the bulk

SPECIAL REPORT TO MANAGEMENT

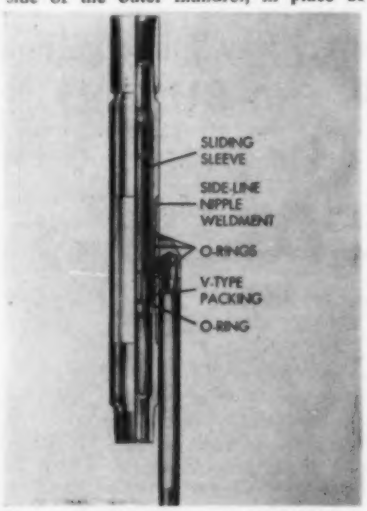
OTIS PRODUCTION NEWS

Volume II, Number 2 **Otis Engineering Corporation • Dallas** *Production Equipment and Services*

New Otis Cross-Over Tool Solves Zone Feeding Problem In Single String Dual Completions

Sliding Side-Door® With Special Weldment Provides Complete Zone Isolation With Cross-Over Chokes Out of Well

CORPUS CHRISTI — Another downhole completion and production problem has been solved by Otis Engineering Corporation with the development of a new type of cross-over tool. The new tool is essentially a Type A Otis Sliding Side-Door to which has been added a special one-inch pipe weldment on one side of the outer mandrel, in place of



the usual slotted ports. The tool is designed to be made up in the tubing with a short tubing sub and Type S Otis Landing Nipple above it and a tubing sub and Ported Landing Nipple below it, and then set in a dual or by-pass type packer. When installed with a Type SS Otis Plug Choke set in the ported nipple, the sleeve may be opened to permit production from the upper zone to be brought into the tubing through the one-inch pipe weldment while flow from the lower zone is directed into the annulus.

See schematic well diagram — right

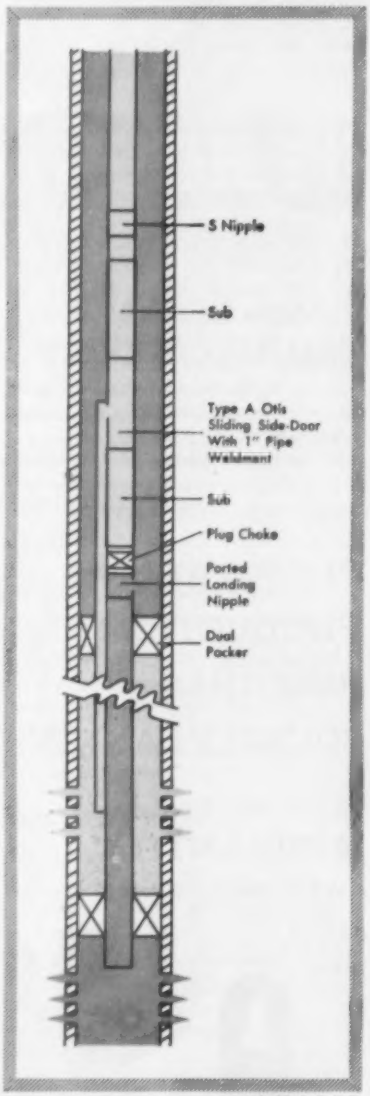
If desired, a straight flow choke may be landed in the assembly to permit production of the lower zone through the tubing while flow from the upper zone is produced through the annulus.

This new Otis Sliding Side-Door Cross-Over was developed at the request of a progressive Texas-based producing company which had experienced extended periods of lost production from the low pressure zones in its single string dual completions after changing a cross-over choke in conventional cross-over equipment, or when a choke had been out of the well for a short period of time for various types of wire line work. This loss of production proved to be the result of the high-pressure zone feeding the low-pressure zone.

According to the company, the new Otis Sliding Side-Door Cross-Over not only proved effective in solving its zone feeding problems, but it has also eliminated the need of having a pump truck on location to equalize pressure across the two zones — as was frequently necessary before the choke could be removed from conventional cross-over equipment. The company also reports it has successfully fractured the upper zone of a number of its wells through the one-inch pipe without damaging the tool.

The Type A Otis Sliding Side-Door, from which this new type of cross-over was derived, is a circulating and production tool which is used downhole to provide selective communication between the tubing and the annulus. The tool has a ported sleeve which is designed to be moved up or down within a ported mandrel. The sleeve may be shifted by one of two ways: 1) by standard wire line methods, or 2) by pumping down an expendable shifting tool. V-type packing and O-rings are used to provide a positive seal between the sleeve and the mandrel when the sleeve is closed.

The new Otis Sliding Side-Door Cross-Over is another example of the ingenuity of Otis' well completion specialists in the field and its engineering department in Dallas. Literally thousands of production problems of this nature have been solved by Otis over the past 32 years. For more information on the new Otis Sliding Side-Door Cross-Over, or for help with any specific production or completion problem, call the Otis office nearest you or write Otis, Dept. 2-W, Box 35206, Dallas 35, Texas. You will find your Otis specialist ready to help you — anxious to serve you.



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of the oil, and much of the suspended solids in the waste water. Atlantic expects that 97% of the nonvolatile oil will be removed, bringing the oil content in the treated effluent below the acceptable maximum of 30 parts per million.

A low degree of alkalinity must be maintained in the effluent water.

Automatic addition of either acid or caustic solutions, after the API separator stage, keeps the effluent water around 7.5 pH. The raw waste water may vary from 4 pH (highly acid) to as much as 12 pH (highly alkaline).

An air flotation process for removal of the remaining solids is the second stage of the operation.

This process consists of dissolving air at a pressure of from 30 to 40 psi. into the waste water. When the pressure is released, extremely fine air bubbles are formed. These become attached to the suspended matter in the water (solids and last traces of oil) and rise as scum to the surface.

Some alum is added to the water before pressurizing to improve the separation process.

It was found during the pilot plant studies that pressurizing only one-half of the water, then mixing the two flows together in the decompression tank, gave substantially the same result as pressurizing the entire mass of water. The new plant was therefore designed on that basis.

The water discharged from the treatment plant into the river meets by a comfortable margin the bacteriological standards set for bathing water by the State of Pennsylvania, Atlantic says.

The water-treatment plant at Texaco's Anacortes (Wash.) refinery is more elaborate, because the effluent is discharged into waters important to the fishing and oyster industry.

Texaco's engineers J. J. Samsel and E. A. Hawkins told the API meeting that the Puget Sound refinery, rated at 40,000 b/d, is located in an area noted for its oysters, its crabs, and especially its salmon fishing.

In this plant, the engineers explained, a storm water sewer had been provided to collect separately uncontaminated storm water, as well as the backwash of the zeolite softening equipment, which needs no treatment.

In the Texaco treatment plant, API oil separation is followed by chemical coagulation, biological oxidation for the destruction of phenols, and filtration. The separator is designed to handle some 5.8-million gal. per day.

A surge basin of about 120,000 gal. capacity and an overflow basin of about 2.2-million gal. capacity provide additional storage for normal peaks and for abnormally heavy flows.

The water collected in these basins is processed when the heavy flows have subsided.

Biological treatment insures an effluent having no more than 0.2 parts per million of phenols.

This treatment is initiated on a trickling filter, where the organic matter is slowly absorbed by biological growth under an active circulation of air.

The sludge is thickened, collected on a vacuum filter, and incinerated.

The average oil content of the effluent water is 2.5 parts per million, much below the maximum allowable content of 10 ppm. prescribed by the State of Washington.

Recovered oil, collected in coil-equipped emulsion-breaking tanks, is periodically pumped back to the refinery.

The effluent water is maintained at a low alkalinity of about 7.2 pH.

At the same API session, S. O. Brady, of Humble Oil & Refining Co., reviewed the latest additions to API's extensive manual on disposal of refinery wastes.

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What's New / IN PROCESSING

A low-temperature purification plant is being used by the Solvay Process Division of Allied Chemical Corp., at Moundsville, W. Va., to produce ultrapure methane from natural gas.

The low-temperature process equipment, designed and constructed by Air Products, Inc., is contained in a single "cold box." Processing methane at temperatures low enough to keep it a liquid requires only a fraction of the space used in a warm-type purification process.

Solvay will use the product in the manufacture of chlorinated hydrocarbons such as carbon tetrachloride, chloroform, methyl chloride, and methylene chloride.

•

Shell Chemical Co.'s expanded facilities for the production of polyisoprene will have three times the capacity originally planned.

The Torrance (Calif.) plant is currently being expanded to produce 40-million lb. per year of polyisoprene, the so-called "synthetic natural rubber." Completion of this addition is expected this fall.

A separate second installation, still in the engineering design stage, will be on stream one year later. It involves the construction of an 80-million-lb.-per-year monomer-polymer plant in the Midwest. Hydrocarbon feedstocks for this plant will come from Shell Oil Co.'s Wood River refinery, near St. Louis.

•

A $3.6-million, 10,500 b/d propane deasphalting unit will be built at Sun Oil Co.'s Toledo (Ohio) refinery.

The company says the new unit will be the largest such facility in the United States. Construction will begin in August, with completion set for the spring of 1961.

A major part of the deasphalter will be three towers, enclosing rotating disk contactors (PW—May15'59, p137). Sun expects the contactors to assure thorough mixing of residual fuel oil with the propane that will be used as a solvent in the process.

•

A new HF alkylation unit with a capacity of 1,500 b/d of butylene alkylate has gone on stream at the Santa Fe Springs (Calif.) refinery of Wilshire Oil Co.

Wilshire says the new unit has been designed for fuel economy; it will get a substantial part of its process heat by using exhaust steam in an iso-stripper side cut reboiler.

Universal Oil Products Co. licensed and designed the new plant and Wilshire and C. F. Braun did the construction.

•

Cosden Petroleum Corp. has granted a license for the use of its technique for producing polybutene to Naphtachimie, owned by Pechiney of France and Societe Francaise des Petroles BP.

The license grants exclusive manufacturing rights in the European Common Market area.

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Three Firms Vie to Move Canadian LPG

Three pipeline companies have entered the competition for the by-product transportation market that's expected to burgeon with the new Canadian natural gas exports to the U.S. (PW—May13'60,p48).

Some Canadian producers now estimate that by 1962 about 92,000 b/d of liquid hydrocarbons will be produced along with the 1-billion cf/d of gas (PW—Apr.8'60p23). Canadian demand, however, is expected to reach only some 23,000 b/d.

The producers are looking to the U.S.—primarily the Chicago refining complex—as a market for the surplus (PW—Mar.18'60,p65).

Interprovincial Pipe Line Co. and Trans-Canada Pipe Lines, Ltd., may challenge Pembina Pipe Line, Ltd., first company to propose a pipeline to move the surplus LP-Gas into the U.S. (PW—Mar.4'60,p68).

Actually, the Canadian portion of the latter line would be built by two Pembina subsidiaries, Westalta Products Pipe Line, Ltd. and Foothills Pipe Lines, Ltd.

Westalta's section would run from Kaybob south along the Alberta Foothills to Pincher Creek, then east to the Saskatchewan border.

Foothills would then build the 16-in. line to the North Dakota border.

It's still a question who would construct the U.S. portion of the line.

An informed source says that Interprovincial "is looking seriously at large-scale movement of byproducts in liquid form in its crude stream."

Interprovincial's crude line passes through northern Minnesota, Wisconsin, and Michigan, en route from Western Canada to Toronto.

The fact that Interprovincial already has a line in the U.S. Upper Midwest may give it a sharp edge in any struggle to serve the anticipated LPG export market.

Interprovincial is presently looping its line, which reportedly would give it sufficient capacity to move both crude and the gas liquids.

Also, there are indications that the company may step up construction of the loops to have them finished by the time the gas exports get under way.

Trans-Canada is studying shipment of byproducts through its gas pipeline to the U.S. and Eastern Canada.

Trans-Canada is now building a line from its main pipeline near Winnipeg to Emerson, Manitoba, to export some 204-million cf/d of gas to Midwestern Gas Transmission Co.

This new line could also provide an outlet for LPG to the U.S. Midwest.

From Winnipeg, Trans-Canada's main transmission line goes to Toronto, thereby providing an outlet to Eastern Canada markets.

The company reportedly envisages the construction of two extraction plants, one near Winnipeg to separate LPG for the U.S., and another somewhere in eastern Ontario to serve markets in Ontario and Quebec.

If the plants are built, their total capacity probably would be between 250,000 and 300,000 gal. a day.

At an extraction rate of 300,000 gal. a day, just over 7,000 b/d of liquids would be produced. This amount would not cut deeply into the surplus anticipated. It would help hone the competition for pipeline business, however.

A possible advantage to both Trans-Canada and Interprovincial in Canadian government circles is the fact that their pipelines can supply Eastern Canada, as well as the U.S., with liquids.

The Alberta Oil & Gas Conservation Board will hold a hearing on May 30 on the Alberta section of the Pembina line. Some in the industry feel that the board will take this opportunity to announce a policy with regard to byproducts exports.

"The hearing is seen as all-important and will shed light on the government export policy," one observer says.

Heretofore, Alberta has tended to keep a tight grip on its byproducts as a possible incentive for the location of more petrochemical plants in the province.

Eastern Canada is also being viewed as a growing market for LPG.

Says J. W. Kerr, Trans-Canada's president, "We are delighted at the prospect that a great new source of energy will be coming to Ontario."

On the other hand, most Western Canada gas producers claim that the only realistic solution to the surplus is approval of exports by Alberta and the National Energy Board.

LPG marketers in the U.S. Midwest are concerned about the possibility of a big price drop if the Canadians export their liquids.

To win buyers, one says, the Canadians will have to beat U.S. prices. "And it can't be a skimpy discount either," he adds, "because a customer wouldn't leave us for a lousy 0.25¢ or 0.375¢ a gal."

The Midwest marketers are also angry at what they call "unfair advantages" enjoyed by their potential competitors. They cite the absence of import duties here, as contrasted with the "stiff taxes" they pay to do business in Canada.

Truck Operators Blast Railroads

Efforts by the railroads to move into the trucking business came under slashing attack last week from Welby M. Frantz, American Trucking Assn. president, at the annual convention of the National Tank Truck Carriers, Inc., in San Francisco.

In his talk to some 325 tank truck men, Frantz accused the railroads of refusing to cooperate with truckmen in developing an integrated transportation system.

The railroads "are trying to untie themselves from the tracks in a brazen attempt to muscle into an industry that they have done everything in their power to retard or destroy," Frantz asserted.

He said that the railroads have spurned requests by truck men to work out cooperative procedures for piggyback and containerized shipments.

"We need and need badly a set of ground rules equitable to both railroads and highway carriers on these subjects," he asserted.

The truck men also heard a debate on common carriers vs. private carriers, which ended in one conclusion: Cost must dictate the choice.

"As firmly as we believe in the need for your services, we cannot justify hiring them if we can do the job better and cheaper on a realistic basis," A. G. Anderson, general traffic manager of Mobil Oil Co., told the tank truck operators.

He added, however, that the higher rates often charged by common carriers are the result of "unusually strict" government control.

Ed Seaton, Jr., president of Re-

finers Transport, Inc., Nashville, Tenn., a common-carrier firm, questioned whether oil and other companies "accurately" knew their costs in private fleet operation.

He intimated that companies, in figuring their costs, often don't take into account administrative costs and capital investment.

The practice of some private carriers of actually buying a cargo and then selling it to the receiver to avoid Interstate Commerce Commission rate regulation is the main problem facing common carriers, according to John A. Roberts, vice-president and general traffic manager of P. B. Mutrie Motor Transportation, Inc., Waltham, Mass.

"The so-called 'buy and sell' trucking operations . . . are very common and a thorn in the side of legitimate for-hire carriers . . . and a subterfuge to evade regulation," he declared.

He added that it probably would take congressional legislation to bring these operations under ICC.

Despite stiff competition, however, annual revenue of the tank truck industry has zoomed—from $34-million in 1943 to $277-million last year.

Tank trucks carried 90-million tons of commodities intercity last year, compared with only 17-million tons in 1943, and traveled 618-million mi. compared with 141-million mi.

What's New / IN TRANSPORTATION

Minnesota Pipe Line Co. has disclosed plans to build a crude pipeline from near Regina, Saskatchewan, to its main line at Clearbrook, Minn.

Actual construction of the line would be by Northern Pipeline Co., Minnesota Pipe Line's Canadian subsidiary, which is now seeking authority to build and operate pipelines there.

Proposed throughput of the 16-in. crude line would be 58,000 b/d. Of the total, 26,000 b/d would come from Fosterton and other southwest Saskatchewan fields; 12,000 b/d from fields in southeast Saskatchewan; and 20,000 b/d possibly from the Williston Basin.

From Clearbrook, Minnesota Pipeline would move the crude to refineries at Pine Bend, Minn.

•

Transwestern Pipeline Co.'s natural gas line from West Texas to the Arizona-California border will be ready for operation in July—ahead of schedule (PW—Apr.22'60,p76).

Welding and ditching are completed on the 1,800-mi. line, and it's already about 50% clean and tested.

•

Ajax Alberta Pipeline, Ltd., will extend its natural gas pipeline system to tap reserves in the Westlock Viking Sand field, in Alberta.

The $2.5-million expansion calls for construction of 32 mi. of line from the field to Ajax Alberta's existing line near Morrinville.

•

A bill has been introduced in Congress that would exempt from regulation transportation of bulk commodities—including liquids—by railroads.

Sponsor is Rep. Oren Harris (D., Ark.), chairman of the House Commerce Committee.

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An annual rate increase of $8.5-million proposed by Michigan Wisconsin Pipe Line Co. has been suspended by the Federal Power Commission until Oct. 7.

The hike would affect 23 existing customers and 15 new ones.

•

A 25-mi. gathering system is being completed to connect 1959 crude discoveries of Skelly Oil Co. in the Cahoj and Wilhelm fields, Rawlins County, Kan., and Reiher field, Hitchcock County, Neb.

The new system will be tied in with the main line of Service Pipe Line Co. by 10 mi. of 4-in. trunk line.

•

Engineering

Remco Mfg. Co., Tulsa, has built what it claims is the largest mechanical pipe-cleaning machine ever made.

The 10-ton machine is capable of cleaning pipe with diameters of from 24 to 42 in., Remco says.

Actual scouring is done by Remco rotary cup cleaning brushes, which are rotated in a counter motion around the pipe by a 75-hp. motor.

Remco says the cleaner will be used by a large eastern pipe producer.

Gas in Underground Storage Hits Peak

Volume of natural gas in underground storage climbed to 1.9-trillion cu. ft. last year from 1.76-trillion cu. ft. a year earlier.

Total underground storage capacity declined, however, by nearly 200-billion cu. ft. from the 2.7-trillion cu. ft. recorded in 1958.

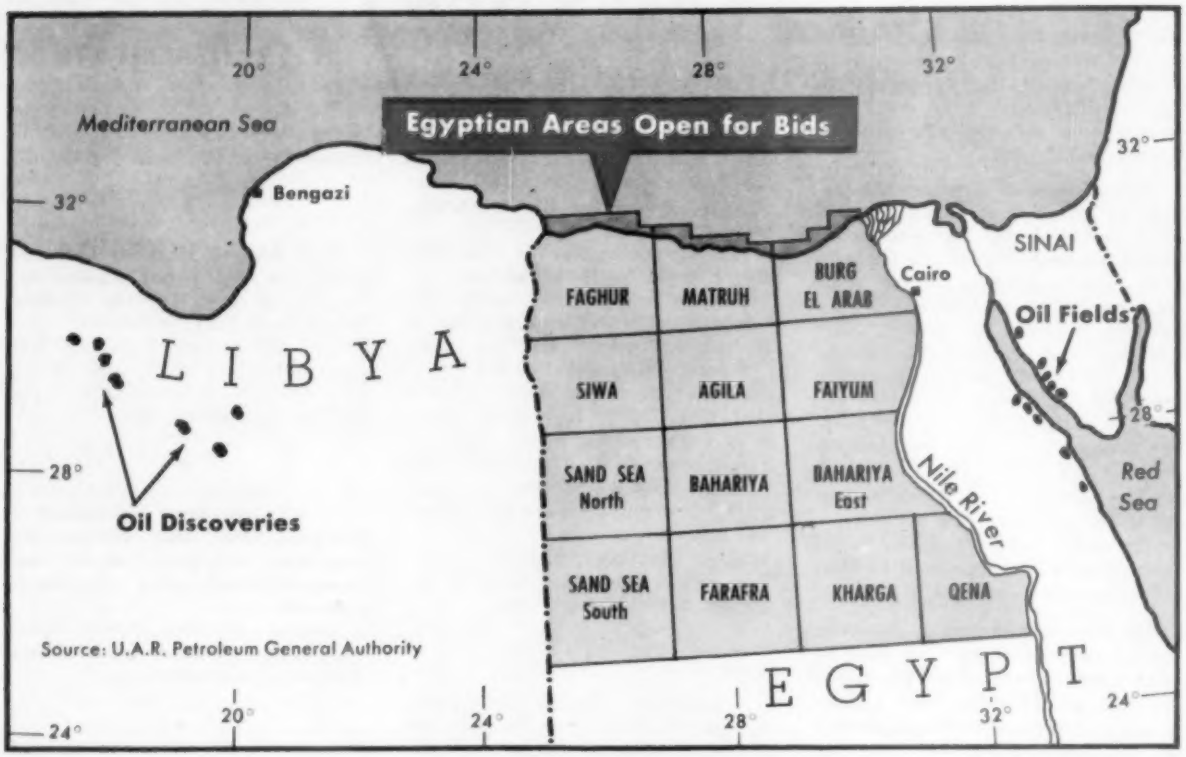
Latest figures on underground storage were reported by Lysle R. Kirk, chief geologist for Ohio Fuel Gas Co., at the American Gas Assn.'s distribution and transmission conference in New Orleans last week (PW—May13'60,p46).

Kirk noted that last year there were 209 storage pools and 8,512 active wells in 20 states, compared with 205 pools and 8,237 wells in 19 states in 1958.

The biggest gains in gas in storage were registered in Illinois, Missouri, and Mississippi.

Illinois, Missouri, and Iowa, however, accounted for 85% of the drop in capacity.

States	Total Reservoir Capacity Millions of cu. ft.	Gas In Storage Dec. 31, 1959
Arkansas	5,204	4,831
California	99,038	91,018
Colorado	187	164
Illinois	45,915	45,140
Indiana	12,454	10,253
Iowa	49,894	46,401
Kansas	83,623	62,702
Kentucky	27,265	24,193
Michigan	397,498	285,259
Mississippi	7,057	5,538
Missouri	9,717	9,718
Montana	87,076	41,057
New Mexico	77,872	47,741
New York	65,232	57,560
Ohio	433,516	336,766
Oklahoma	179,977	105,617
Pennsylvania	496,849	404,256
Texas	50,687	44,264
West Virginia	328,524	258,294
Wyoming	62,972	20,424
TOTAL	2,520,554	1,901,198



Will Sahara's Luck Hold for Egypt, Too?

Does the oil luck of Algeria and Libya extend into neighboring Egypt? The answer may be found soon, now that exploration bids are being sought in the same Sahara desert that also extends into Egypt.

The United Arab Republic has opened 13 newly created blocks, covering a total of 115,800 sq. mi., for bidding extending from the Nile River to the Libyan border (map).

Several oil companies have shown interest in Egypt's Western Desert, despite past disappointments there, since the Libyan discoveries last year.

Among the companies are Pan American International, Atlas Corp., Mobil, Italy's state-owned ENI, and Anglo-Egyptian Oilfields, Ltd., affiliate of Shell and British Petroleum.

ENI, Shell, and Mobil already have stakes in the Gulf of Suez oilfields, in the eastern part of Egypt. They are Egypt's only proved oil resources, producing some 58,000 b/d.

Through 1958, 13 nonproductive deep tests were drilled in the Western Desert. The latest, by Sahara Petroleum Co., were finally abandoned two years ago. This company was operator for Continental, Richfield, Cities Service, and Ohio Oil which gave up their concession.

Terms for the new oil rights maintain the 50-50 principal only if national capital participates in development of oil discoveries.

The government retains the option of deciding whether there shall be such participation in the Arab companies that must be set up.

If national capital is invested in the enterprise, the government receives either "the aggregate sum of royalties, rentals, and taxes" or 50% of the net profits, whichever is greater, "without stipulating its share as participant in the Arab company," the Petroleum General Authority announced.

If there is no Arab capital involved, "the government is entitled to receive either the aggregate sum of royalty, rentals, and taxes or a percentage higher than 50% of the net profits."

Companies must submit applications on both bases.

Royalties, which vary for each concession, range upward from 15% for the first ten years.

They will be raised to 25% for the remaining contract period and during any renewals.

Bids, due Aug. 15, must conform to the following terms, some of them exemptions from the Mines Law of 1953:

Acreage: Each company may apply for any or all of the tracts, but normally will receive only one or two. Tracts range in size from 9,880 to 14,440 sq. mi.

Relinquishment: Each concession is divided into 144-sq. mi. exploration permits, which must be relinquished as follows—25% by the end of three years, 50% by the end of six years. After the tenth year, only 15 permits may be kept, not including those where there is production.

Drilling Obligation: A company must set forth its drilling plans, specifying number of rigs to be used and the date for the first test.

Refining: Willingness of a company to refine part of its production locally, after exceeding a specified output, will be "highly considered in granting a concession."

Rentals: Rentals need not be paid for ten years, but an equal amount must be used for exploration.

Creole Reports Wider Price Discounts

Creole Petroleum, Venezuela's biggest producer, revealed last week that it is currently forced to sell about two-thirds of its total output at a discount.

This was brought out by Creole vice-president H. A. Metzger in answer to questions at the annual stockholders' meeting, in New York, of the Jersey Standard affiliate.

A year ago, Metzger said, half of the total output was sold at a discount. The discounts are made to hold markets in the face of stiffening world competition. As a result, Metzger said, Creole has felt virtually "no erosion" of its outlets. Sales are "practically" up to the 1957 peak, he said.

Creole's average discount is "not over" 10% off posted prices, Metzger told stockholders. The company's posted crude prices range from $1.75 to $2.40 per bbl.

Creole reported an 18% decline in its net income in the first quarter of 1960, to $55.6-million, compared with $68.4-million in the same period of 1959. (For the whole of 1959, Creole's net was down 15%, to $200.3-million, from $235.7-million in 1958.)

Crude output in the first quarter this year was down 8% to an average of 1,117,000 b/d, while refinery runs were up 7% to 388,000 b/d. Sales remained almost unchanged at 1,248,000 b/d.

Creole president A. T. Proudfit reported that the chief cause of the 18% decline in net income was a pair of crude price cuts—one in February, 1959, which was not felt in the first quarter of last year, and another in April, 1959.

Creole has "no expectation" of marketing any oil for Venezuela's new state oil company, Proudfit told stockholders.

Asked whether Creole might nevertheless be "forced" to do so by the Venezuelan government, Proudfit said he felt such action would be "precluded" by the Oil Minister's official promise that the state company would be operated "on the same basis" as private oil firms.

The only real problems, he said, might arise in unitized production—in cases where private company properties adjoin acreage held by the state company, and a joint pool results.

"But even then," he added, "we expect the state company to take its own production, in view of the Ministry statement."

Creole's president sees "no immediate danger" of international proration of production.

"To date," he reported, "there has been no concrete development in this matter," though the Venezuelan government "continues to manifest interest in the possibility of an agreement with some other major producing areas of the world to establish production controls."

Though prorationing may be "interesting" in theory, it would be unfeasible from a practical standpoint, Proudfit indicated. "In the U.S.," he said, "proration is one thing; in Venezuela it would be something else again." The U.S. consumes all its own production, while Venezuela consumes only 6% of its own oil, Proudfit pointed out. So if Venezuela were to restrict production, it would automatically reduce its shipments to foreign markets—which would be filled from other sources. Thus Venezuela would merely be cutting its own income.

Conorada Maps Marketing Plans for Its Libyan Oil

The Conorada group is considering two-fold marketing of its Libyan oil—direct sales in Europe and exchange of crude with other suppliers, according to Paul L. Henderson, vice-president of Ohio Oil Co.

Conorada is jointly owned by Continental Oil, Ohio Oil and Amerada Petroleum, and operates in Libya through an Ohio affiliate, Oasis Oil.

"Some time ago," Henderson said, "we began an investigation of markets in Europe where it appears we have a geographical advantage.

"A number of markets appear feasible, and we feel we can share in supplying the growth in demand west of Suez.

"In addition to direct marketing of our Libyan crude," he went on, "we are pursuing a number of possibilities for exchanges, and for other arrangements that will permit production of our Libyan oil."

The group also disclosed recently that construction of facilities to move its crude out of Libya "will probably be initiated later this year."

Conorada has made several discoveries in the North African country. It is the most active operator in Libya, and holds oil concessions on one-seventh of the total area of the country.

Conorada has tentatively selected deepwater marine terminal site on the Mediterranean and a pipeline route to link it to its Dahra fields, 85 mi. inland.

Conorada has a whole cluster of wells around Dahra. The main oil zone there has tested as high as 8,000 b/d in some wells.

The group is also conducting negotiations with other companies "to develop joint participation in construction and operation of transport and export facilities," Ohio vice-president, Howard H. West, recently revealed.

Ohio Oil is noncommittal on these negotiations. It previously reported it would like to tie production from another of its discoveries, some distance east of Dahra, into the pipeline to be constructed by Esso Standard (Libya).

The group has under study "various alternatives for the establishment" of a permanent operating organization in Libya, Henderson reported.

This permanent company would conduct all future exploration and field development programs, replacing Oasis Oil.

Can't Lick 'Em? Then Join 'Em

TOKYO—A new element is appearing in Japan's booming and competitive oil business: Coal mining firms are moving in—in an effort to recover from their year-long recession.

Furukawa Mining Co. has just set up Furukawa Oil Trading Co. to market 63,000 bbl. of products monthly, which will be supplied by the independent Daikyo Oil Co.

Earlier, Mitsui Mining Co. set up General Gas Co. (a joint venture with General Bussan Co.), which has now applied for approval to import 35,000 tons a year of LPG from Saudi Arabia, starting in 1961.

What's New / AROUND THE WORLD

CUBA—Russian products will be marketed in Cuba for the first time this week. The government's Petroleum Institute has announced that it will start nationwide marketing of Russian gasoline, gas oil, fuel oil, and kerosine. So far, Cuba has received two cargoes of products and one small cargo of crude (destined for refining at the 2,000 b/d Cabaiguan refinery) under a trade pact with the Soviet Union.

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INDIA—A 20,000 b/d refinery in southern India is now being considered by the Oil Ministry, in line with current aims to spread refining to more consumption centers.

This would be in addition to the two government plants slated for northeastern India, and the 10,000 b/d plant the ministry wants to build in western India's Cambay region, where the Oil & Natural Gas Commission last week brought in its seventh oil producer.

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IRELAND—Ambassador Oil Corp., of Ft. Worth, Tex., says Ireland will be the scene of its "big wildcat play this year and probably for several years in the future." It was recently awarded 20-million acres, onshore and offshore, in the Irish Republic.

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ISRAEL—Israel's first limestone production has been tapped about 200 ft. below present oil producing sands, at 5,000 ft. in the Heletz field. The No. 25 test penetrated 12 ft. of porous limestone, which will be further explored in No. 26.

Lapidoth Oil Prospectors Corp. says the discovery may lead to re-examination of many of the dry holes drilled in the coastal area, as well as of Heletz wells that produce only from the Heletz sands.

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SPANISH SAHARA—The Sohio-Tidewater group has increased its Spanish Sahara concessions to a total of nine.

The Spanish Cabinet has awarded Block 56 to Sohio Iberian, which is associated with Tidewater and the Spanish banking group, Urquijo, in the Sahara venture. The new block is directly south of acreage previously awarded to the group.

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MOROCCO—Shell will build an $18-million ammonium phosphate plant at the port of Safi, with a Moroccan government agency as minority partner. Local natural gas and phosphates will be used by the plant, which will have 100,000 tons annual capacity.

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VENEZUELA — Stekoll Petroleum Corp.'s farmout contract in eastern Venezuela will be assumed by Keith Williams, Inc., a new Dallas-based concern formed to take over Stekoll de Venezuela.

An eight-well drilling program and production of 16,000 bbl. monthly are involved in the 27,000-acre farmout from Venezuelan Atlantic Refining and Pancoastal Petroleum.

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NETHERLANDS—Esso's new 90,000 b/d refinery near Rotterdam was officially opened last week. It's Holland's third and boosts refining capacity to nearly 450,000 b/d. The other refiners are Shell and Caltex.

•

LIBYA—Italy's state-owned ENI has filed for more Libyan acreage, overlapping bids previously made by Gulf Oil, Shell, and Nelson Bunker Hunt, Texas independent. ENI's Libyan affiliate, CORI, holder of one tract awarded last fall, is seeking a 29,070-sq. mi. concession in southeastern Cyrenaica, not far from the Egyptian border.

•

SPAIN—Construction of a $26-million petrochemical plant in northern Spain has been proposed by Standard Oil Co. (N. J.) and Cepsa, Spanish private oil firm that will supply feedstock from its Canary Islands refinery. Possible sites are Bilbao and Santander.

The project calls for two-stage development. Upon completion of $10-million first stage, the partners hope to interest a third company in the venture.

•

LIBYA—Pure Oil Co. has set up a new affiliate that may enter the Libyan oil play.

The company denied any immediate plans to bid on acreage there. But the new Delaware corporation, Pure Oil of Libya, Inc., puts Pure in a position to move into the North African picture.

•

SAUDI ARABIA—Due to rising demand for lower-gravity crudes, Aramco is adding another 100,000 b/d of pipeline capacity to its Safaniya-Ras Tanura line. A new $11-million, 73-mi., 30-in. loop will permit delivery of 215,000 b/d of 27-gravity sweet crude from the offshore Safaniya field, and 75,000 b/d of 31-gravity sour crude from Khursaniyah, which will be placed on production this year.

•

ADEN—Iraq Petroleum Co. has announced it is now pulling out entirely from Aden Protectorate. This was anticipated earlier, when Jersey Standard and Socony, the U.S. members in the group, withdrew (PW—Feb.19'60,p85). As a result, the Sultanates of Quaiti and Kathiri announced they will invite other oil companies to bid for the Thamud area.

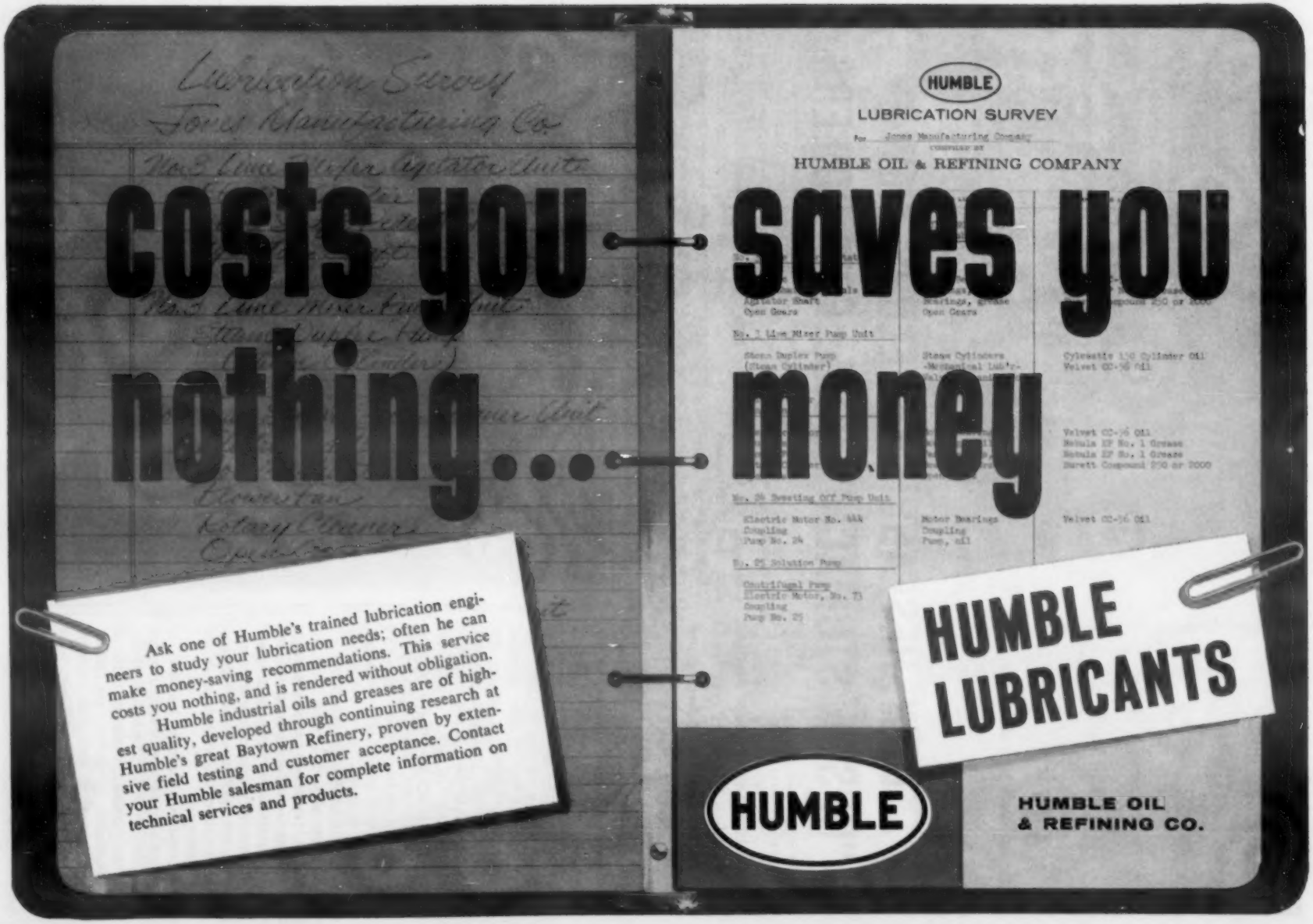
•

AUSTRIA—Agreement in principle has been reached on a new state-private marketing company to be owned 13% each by Mobil and Shell and 74% by the Austrian Mineral Oil Administration. Each partner is to draw its own share of products from the prewar refineries operated by Mobil and Shell and the new state-owned plant that will go on stream at Schwechat in October.

Tariki Decorated

CARACAS—Saudi Arabia's oil director was decorated by Venezuela last week.

The order of Francisco de Miranda, First Class, was bestowed on Sheikh Abdullah Tariki, who was in Caracas on a visit at the government's invitation. He was conferring with Oil Minister Dr. Juan Perez Alfonzo and other Venezuelan officials and was accompanied by Mustafa Wahba, Saudi assistant petroleum director.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DOW

serves
PETROLEUM
across
the board

When the laboratory lights burn late in Midland, chances are research is hot on the trail of something new. And in the petroleum lab, this is especially true. Dow petroleum chemists are not content to rest on their past accomplishments. Some of the projects that are keeping them after hours these nights: new chemicals to speed up refining processes, new chemicals to make production and gas conditioning more efficient—plus some new uses for the tried and true petroleum chemicals. Here are some that are making news in the petroleum industry today . . .

DOW RESEARCH DEVELOPS NEW "UPSET STOMACH" CURE FOR BOILERS

The problem of residual fuel oil ash corrosion in boilers and heaters has been a headache for the refining industry for years. Dow's development of dry magnesium hydroxide has opened the door for a new, low-cost answer to the problem.

Traditionally, there have been several approaches to a solution for the problem of residual fuel oil ash corrosion. Treating the oil itself to remove the corrosion-forming vanadium, sodium, and sulfur compounds is too expensive to be practical. The use of costly high temperature alloys has not proved completely satisfactory, either. Although it is possible to choose a good protective alloy to resist a single corrosion agent, the choice becomes more difficult if many such corroders are present.

The same objection holds true for corrosion-resistant protective coatings. In addition, the adherence of protective coatings under extremely high-temperature conditions is often a problem.

Of all the approaches, the introduction of additives into the system is the most promising.

Experiments with many hundreds of compounds have proved the effectiveness of magnesium in combating the oil ash corrosion problem. Of the many forms of magnesium available, magnesium oxide, magnesium hydroxide, magnesium sulfate, and dolomite have been most attractive economically to the industry. Of these forms, magnesium hydroxide best provides the desired combination of low cost, ease of handling, and effectiveness.

Dry magnesium hydroxide, because of its fine particle size, may be blown directly into the combustion chambers of boilers or heaters. It combines with the fuel oil ash, raising the melting point of the ash so that it remains dry and will not attack the metal surfaces.

An extra bounty is gained when using magnesium hydroxide—acid vapors that ordinarily condense and corrode the cooler areas of the boilers are neutralized. The elimination of the acid

Blown into boilers in dry form, Dow's new dry magnesium hydroxide helps prevent corrosion from fuel oil ash.

deposits cuts down costly draft losses and extends the period between cleanings.

The formulation of a dry magnesium hydroxide is an example of the constant research activities at Dow in behalf of the entire petroleum industry. The corps of petroleum chemical researchers at Dow has amassed a wealth of technical knowledge. And Dow has placed this "task force" at the disposal of the petroleum industry. In the application of polyglycols, for example . . .

POLYGLYCOLS:

Chemical sleight-of-hand

In the field of polyglycols, Dow petroleum researchers pulled the proverbial rabbit out of the hat when, in conjunction with Universal Oil Products Corporation, they originated the now-famous Udex® Process. Using super-selective glycols—Dow diethylene, dipropylene, and triethylene glycols—this extraction method separates and purifies desired aromatics from hydrocarbon mixtures. The solvents are so selective, in fact, that several aromatics can be extracted simultaneously—at high purity levels. The Udex Process has made possible the economical refinement of benzene, toluene, and xylene from feed stock.

Dow's Udex grade glycols separate high-purity aromatics from feed stock.

DOW AMMONIA:

Low-cost acid protection

Dow Anhydrous Ammonia provides the industry with low-cost corrosion protection against the acids inherent in crude petroleum. In refining and processing equipment especially, ammonia acts as an anti-corrosion agent in cracking stills, bubble towers, straight run fractionators, and other operations. It inhibits troublesome hydrogen sulfide in the processing of sour crude oils in the vapor zone of still tanks. Often more economical to use than protective coatings, high-quality Dow Ammonia is available for fast, dependable delivery.

Production and gas conditioning, too

DOWTHERM 209:

Breakthrough in ebullient cooling

If you've been wary of converting large internal combustion engines to ebullient cooling, forget it! Now you can have all the benefits of this efficient method of cooling, plus complete, practical freeze protection down to —45°F. with Dowtherm® 209!

A development of Dow petroleum research, Dowtherm 209 forms a constant boiling mixture with 47% water by weight. Used in an ebullient cooling system, it can prolong the life of your engine, improve its performance, and make possible the use of cheaper fuels. Ebullient cooling means faster engine warm-up; automatic circulation and temperature control; and permits engines to run at more efficient temperatures.

Further, engineers estimate, in 95% of the cases, change-over from conventional to ebullient cooling systems is a simple matter.

GAS CONDITIONING LAB:

Do-it-yourself process aid

Besides on-the-spot help for glycol and amine users, the Dow Gas Conditioning Lab is equipped to provide fast, convenient, do-it-yourself help to solve certain processing problems. Take the analysis of used ethanolamine solutions, for example. When processors contact Dow, describing their individual requirements for assistance in this area, chances are the Dow Gas Conditioning Lab will be able to outline a detailed, step-by-step procedure, from apparatus required to calculations used, based on their broad background in the chemistry of gas processing.

This service, as all the services of the Dow Gas Conditioning Lab, is free of charge to any company engaged in gas processing.

DOWELL is Dow's Oklahoma-based division that specializes in providing the petroleum industry with a wide variety of products and services. More than 150 Dowell sales and service outlets are conveniently located in the United States, Canada, Venezuela, and Argentina. Services include gas well acidizing, formation fracturing, cementing services, and a score more. For more information, see your telephone book, or write Dowell, Tulsa 2, Oklahoma.

★ ★ ★ ★ ★

HOW ABOUT YOUR OPERATION? Chances are many of the chemicals described on these two pages would benefit your process. Why not send for full information? Address your inquiry to: THE DOW CHEMICAL COMPANY, Midland, Michigan, Chemicals Merchandising Department 503LR5-20.

THE DOW CHEMICAL COMPANY

Midland, Michigan

DOW

See "The Dow Hour of Great Mysteries" on NBC-TV

API Strives to Boost Motor Oil Sales

Marketers who are worried about the discouraging trend in motor oil sales were given heartening news this week: the API program to stimulate motor oil demand has made considerable progress on several fronts.

This progress was reviewed before the midyear meeting of API's Marketing Division, in Cleveland. Rudolph Cubicciotti, chairman of the Motor Oil Study Panel, described for API members a many-faceted program that is aimed at correcting the declining tendency in the ratio of motor oil sales to the sales of gasoline (chart).

In one phase of API's program, a steady stream of information is being directed toward the public to educate the motorist on "correct" oil-change practices.

This is the first concerted effort undertaken by the oil industry to erase misconceptions about oil-drain periods, and replace them with a firm understanding of the importance of oil changes.

Much of the confusion about oil-drain practice stems directly from the varied recommendations that Detroit carmakers have advertised and printed in auto manuals.

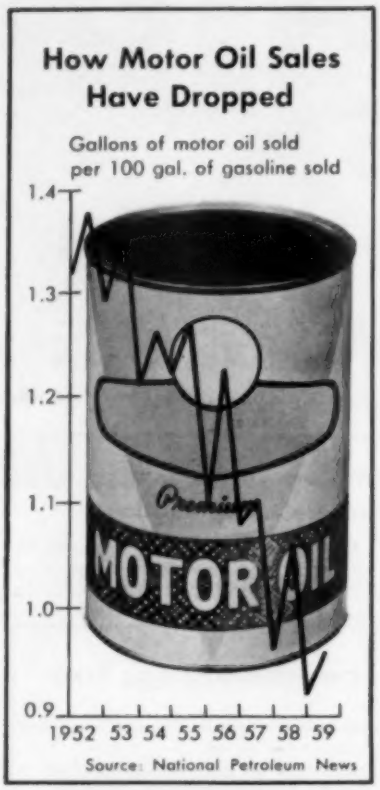
In December, six months after API decided on its own recommendation of 2,000 mi. as a maximum oil-drain interval (with a 30-day limit in the winter and a 60-day limit in summer), the Motor Oil Study Panel appointed a public relations agency—Jones, Brakely, & Rockwell—to sell this recommendation to the motorists.

Several surveys conducted by API have shown that the public is very receptive to the notion of frequent oil changes, despite claims of certain carmakers.

In one survey, 42% of the 1,500 new-car owners interviewed said they observed a drain interval of 2,000 mi. or less, said Cubicciotti. None of them indicated that an extended oil drain interval was among the reasons for their buying a particular make of car.

In another survey, API learned that 86% of the nation's new-car dealers prefer a drain interval of 2,000 mi. or less, compared to an average recommendation by carmakers of 2,846 mi., said Cubicciotti.

Motorists are not generally concerned with the cost of frequent oil changes, nor are they in doubt about the reasons for careful attention to engine lubrication.



These findings were brought out in 50 depth interviews, conducted by Jones, Brakely & Rockwell earlier this year. The survey made clear, however, that motorists still harbor many doubts about the industry's oil recommendations.

The 30-day and 60-day limits for winter and summer driving, respectively, have failed to penetrate, Henry T. Rockwell, president of the agency, told the API Lubrication Committee earlier this week at a meeting at Bedford Springs, Pa.

Furthermore, many motorists are skeptical about oil recommendations when they hear them from oil companies. Most motorists, says Rockwell, feel that, "You can't believe all the oil companies have to say on the subject of oil changes; they're just out to sell oil."

To make certain that the oil industry itself retains a consistent approach toward motor oil, the Lubrication Committee has a program for distributing promotional materials that can be used to increase motor oil sales.

The committee has distributed 14 issues of its bulletin with attachments of promotional material designed to assure proper crankcase oil-drain practices. Most of this material was designed to appeal to dealers and company employees.

Cubicciotti revealed that oil companies are rallying around API's revised drain recommendation. In a recent survey of committee members, 91% of the reporting companies said they had already adopted the recommendation. The rest said they intended to do so soon.

The sorest point in the motor oil picture remains the resistance of certain carmakers on comparatively long oil-change recommendations.

Earlier this year, Jones, Brakely & Rockwell visited both Ford and Buick, hoping to detect a change in their future oil-drain recommendations.

"Unhappily, we unearthed nothing on this mission that would indicate any imminent break on the part of those manufacturers," said Warren Cromwell, assistant to the president, speaking at Bedford Springs earlier this week.

Buick's car manuals suggest an oil drain interval (2,000 to 3,000 mi.) that is not much less stringent than API's. But Ford has tenaciously held to a 4,000-mi. interval, which is twice as long as the oil industry's.

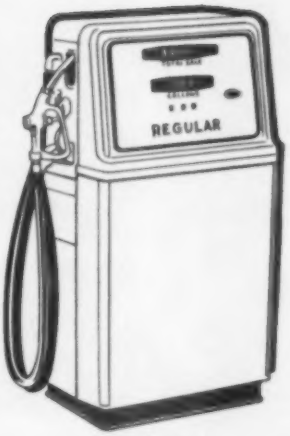
Ford engineers, in speaking with the public relations firm, referred to an interview their company had had with PETROLEUM WEEK (PW—Apr. 8'60,p95). Ford's position had not changed since that interview, the engineers said.

Willard W. Wright, senior vice president at Sun Oil Co., remains optimistic, however. As chairman of the Oil Drain Practices Advisory Group, Wright told the API marketers this week, "Our work with the automobile manufacturers has provided a level of contact that has, and will continue to be, very helpful. We plan to make additional contacts at Detroit so that a progress report can be made to you at the November meeting."

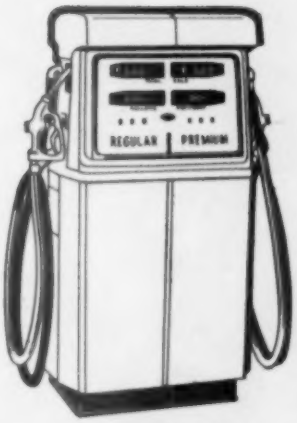
To make this and the other work of the Lubrication Committee continuously effective, Wright asked for a new appropriation of $55,000 for the Committee—$40,000 for the public information program and $15,000 as a reserve for a possible new survey, as well as for contingencies.

Designed to boost your island profits

NEW WAYNE 400 SERIES



Model 400
Only 48 in. high.
For overhead station lighting.



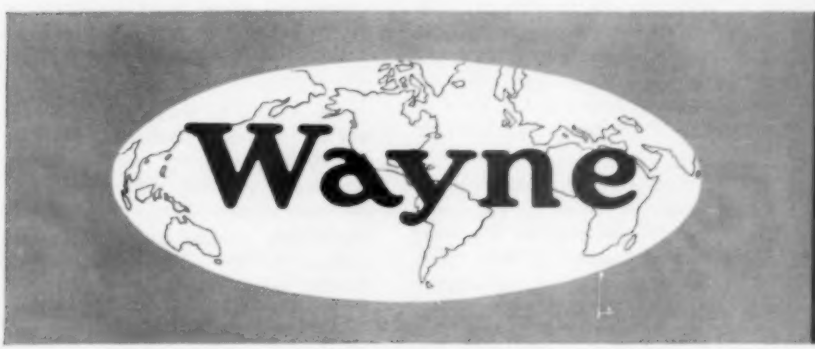
Model 420
Distinctive canopy lighting aids brand identification. 52 in. high.

Speeds dispensing. Wide, easy-to-read dial face. Full 13 ft. of usable hose—a foot longer than ordinary. Nozzle readily accessible from both sides of pump. Semi-automatic reset to prevent accidental erasure of previous sale. Clutch mechanism prevents computer damage.

Saves on maintenance. Large, easily removed panels for quick access. Stainless steel top, side and scuff panels eliminate chipping, repainting. All parts designed for simplicity in servicing—new M56 computer, for example, has 200 fewer parts than previous model.

Attracts customer attention. Low silhouette, liberal use of sparkling chrome for dial bezels and high-polish stainless steel for side panels give maximum eye appeal. Because of their compact design Wayne 400 Series pumps also take less island space, permit more TBA display.

Available as single outlet, duo or 2-product duo dispenser—for either suction or remote pumping. Write for copy of new bulletin W-116.



WORLD'S LARGEST
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SERVICE STATION EQUIPMENT

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ON-THE-JOB TRAINING, such as this warehousing experience, is an important part of the petroleum marketing course.

SERVICE STATION training is another way of completing the two semesters of practical experience required for graduation.

INTERVIEWING DEALERS, as this graduate student is doing, gives students an insight into actual operating problems.

Tomorrow's Marketing Executives End

This week the nation's first crop of college-level marketing students complete their first full year of academic study at the University of Tulsa.

These future marketing executives are part of a revolutionary new approach toward preparing university students for careers in oil marketing. The course they are following was inaugurated in February, 1959, and it will prepare them for B.S. and M.B.A. degrees within the framework of the university's College of Business Administration.

Unlike three or four other programs offered around the nation, Tulsa's instruction is a full-fledged college course, with major emphasis on marketing. A two-year degree, which had been planned at the inception of the program, has been dropped in favor of a four-year program, which provides marketing students with a broad background in other phases of the oil industry.

In addition, a fifth year of study enables a student to receive graduate training in oil marketing. One current candidate for a master's degree is an employee of Continental Oil Co. who has been given a one-year leave of absence.

Oil's increasing emphasis on marketing—and its demands for qualified young men—created the need for a sort of marketing West Point.

In the spring of 1957, a nucleus of 12 executives from oil and related industries met with educators of the university.

Would the university be interested in offering a course designed to fill their needs? they asked.

Speaking for the university, Dr. M. M. Hargrove, Dean of the College of Business Administration, said that Tulsa was prepared to offer such a course, but would provide training in oil marketing only if it could be kept within the educational standards of the school.

The course of study that evolved out of discussion between the university and industry men combines on-the-job training with specialized classroom instruction in petroleum marketing.

In addition, there are general courses to satisfy university requirements, and electives providing specialized instruction in engineering and science.

To check on the students' progress through this maze of learning, a team of industry marketing people will interview each young man at the end

DEMONSTRATING equipment affords students confidence in dealing with employees. Here a future marketing executive instructs an attendant in wheel balancing.

CLASSROOM INSTRUCTION includes 15 semester hours specifically devoted to petroleum marketing, in addition to several courses on other phases of the oil industry.

Their First College Year

of his third semester. If they find that his attitude and adaptation to the program is satisfactory (two students have already been dropped), he is placed in an industry job that provides practical training.

A prospective graduate must spend a minimum of two semesters in an approved line of work, where his progress is reported on each month by the employing company.

Because they are dealing with a new field for academic study, the instructors of the petroleum marketing course have not been without problems.

"One problem has been the lack of texts that adequately cover the subject matter," Professor T. W. Coover, head of the Petroleum Marketing Dept. at Tulsa, told PETROLEUM WEEK.

"Another problem has been the conflicting terminology commonly used by various companies throughout the industry."

Two other members of the department, L. R. Saltzman and William H. Day, who have had extensive experience in the oil industry, are working on standardizing oil terms, and are actively collecting material for a comprehensive text on petroleum marketing. Their efforts should aid not only future marketing executives but also present marketing men as well.

Forty students, representing 16 states and two foreign countries, are currently enrolled in the program.

The two foreign students hail from Egypt and Indonesia. Many of the U.S. students have oil industry background that is as varied as the states from which they come.

What's New

IN MARKETING

Amoco dealers on Long Island, N.Y., supplied themselves with gasoline last week in what officials of American Oil Co. believe to be the first successful effort by dealers to break a truck strike.

The voluntary self-service supply line ended a seven-day walk-out of Teamster drivers and other service workers who had asked for three additional paid holidays, an 8% general wage increase, and other benefits. They settled for one paid holiday and an increase of 10¢ an hour (about a 3% boost for most of the strikers).

•

Oil jobbers—like suppliers—should organize a formal program for stimulating gasoline demand, A. J. Rumoshosky, director of the API Marketing Division suggested last week.

One way of doing this, he told the Connecticut Petroleum Assn., would be for local jobbers to join with gasoline dealers to sponsor driving lessons for nondriving housewives. Only 51% of the nation's women are licensed drivers, he pointed out.

•

"Like watching a big concrete flower wilt, a petal at a time," is the way a Dallas police officer described the collapse last week of a futuristic service station.

The outlet, hailed as one of the Southwest's most unusual stations, sported an "inverted umbrella" for a roof (a hyperbolic paraboloid). This roof collapsed last week, for as-yet undetermined reasons. Built by Windsor Properties, Inc., last winter, the station was supplied by the Humble Division of the Humble Oil & Refining Co.

•

Large, centrally located service stations can serve the motorist better—under some conditions—than smaller outlets scattered around in the immediate area, says Clare R. Wolf, manager of the research task group of Standard Oil Co. (Ind.)

Standard is experimenting with two such superstations in Fairfield, Iowa, and Vincennes, Ind. (PW—Mar.11 '60,p28).

Although Wolf's remarks at a company meeting last week suggested that the superstations are doing well, he reserved full evaluation of the tests until later this year.

F. G. Fabian, Jr.

C. Kuhn

F. G. FABIAN, JR., has been elected executive vice-president of Dresser Industries, Inc., Dallas, and **CHARLES KUHN** succeeds him as president of the Dresser Mfg. Division, Bradford, Pa. Fabian will be responsible for five oilfield divisions: Guiberson Corp., Dallas; Ideco Division, Dallas; Security Engineering Division, Dallas; Lane-Wells Co., Houston; and Magnet Cove Barium Corp., Houston. Fabian, who joined the Dresser organization in 1953, has been president and general manager of the Dresser Mfg. Division, since 1955. Kuhn was formerly vice-president and sales manager of that division. **John V. James** is the new controller of Dresser Industries. He transfers to Dallas from Olean, N. Y., where he was formerly vice-president, finance, for Clark Bros. Co., one of the Dresser Industries.

BEN N. HOGAN is manager of Republic Supply Co.'s Houston sales office, and **John P. Rhodes** is manager of its Dallas-Ft. Worth area. Hogan has been manager of purchasing and administrative services for Pacific Northwest Pipeline Co. since 1956, and before that was associated with Howard Supply Co. and Fluor Corp. Rhodes, with Republic for the past 15 years, has been manager of the Oklahoma district, and most recently manager of the Houston office.

HENRY K. COOMBES has been named field representative in the Permian Basin area for Skinner Bros. Co., with offices in Odessa, Tex. He succeeds **Earl McGill,** who was promoted to assistant to the director of sales earlier this year. Coombes will be responsible for oil areas around Midland, Monahans, Andrews, Denver City, Seminole, and Ft. Stockton, Tex., and Artesia, Hobbs, and Lovington, N.M. He was formerly located at Skinner's warehouse facility at Odessa.

JOSEPH H. DUFF becomes technical manager, and **Martin Wank** sales promotion manager, of Graver Water Conditioning Co., New York, division of Union Tank Car Co. Duff, who has been with Graver for the past ten years, was formerly assistant technical manager. He succeeds **Marvin Lane,** who recently became general manager of Graver Water Conditioning. Wank, formerly assistant sales promotion manager, has been with Graver since 1958.

A. C. POLK is the new president of Dowell of Canada, Ltd., Calgary. He succeeds **John G. Staudt,** who assumes other responsibilities for Dow Chemical Co., Dowell's parent. Polk is also executive vice-president and general manager of the Dowell Division of Dow Chemical. **W. R. Graves** continues as executive vice-president and general manager of Dowell's operations in Canada.

A. C. Polk

G. W. Jones

GORDON W. JONES is the new assistant vice-president and director of construction of M. W. Kellogg Co., New York, and **Luther R. Hill** is assistant to the vice-president of sales. Jones, formerly manager of technical services, will be in charge of construction activities in North and South America, and for development of construction methods for world-wide use. Hill was associated with Kellogg for 23 years, before his most recent activities as a private consultant and process coordinator for Arthur G. McKee & Co. He will be concerned with the transition of research and development process results to commercial industrial applications.

R. D. O'Brien

J. H. Cassell, Jr.

RICHARD D. O'BRIEN and **JAMES H. CASSELL, JR.,** have been elected vice-presidents of U. S. Industries, Inc., New York. O'Brien will be in charge of three USI divisions serving the oil, gas, and chemical industries: Garrett Oil Tools, Longview, Tex.; Axelson Mfg., Los Angeles; and Oil Field Sales & Service S.A., Maracaibo, Venezuela. O'Brien, formerly secretary of USI, was most recently a group officer for the company's petroleum equipment business. Cassell has been director of public relations for the company since 1949. He will continue to direct its public, stockholder, community, and press relations.

CHARLES E. WRIGHT is the new representative for the Ideco Division, one of the Dresser Industries, at Lafayette, La. Wright, with Ideco since 1953, was most recently technical service representative at Dallas. He has also served as manager of pricing and specifications at the Beaumont (Tex.) plant. He will be responsible for sales in Louisiana, Mississippi, and Alabama.

F. DRAKE PARKER has been appointed managing director of McKee Head Wrightson, Ltd., London, formed last year by Arthur G. McKee & Co. and Head Wrightson & Co., Ltd. Parker was formerly a vice-president for Arthur G. McKee. **Douglas H. Carter** has been appointed director and general manager of the British design and engineering company. He was formerly director and general manager of Head Wrightson Processes, Ltd.

F. D. Parker

L. H. Ralston

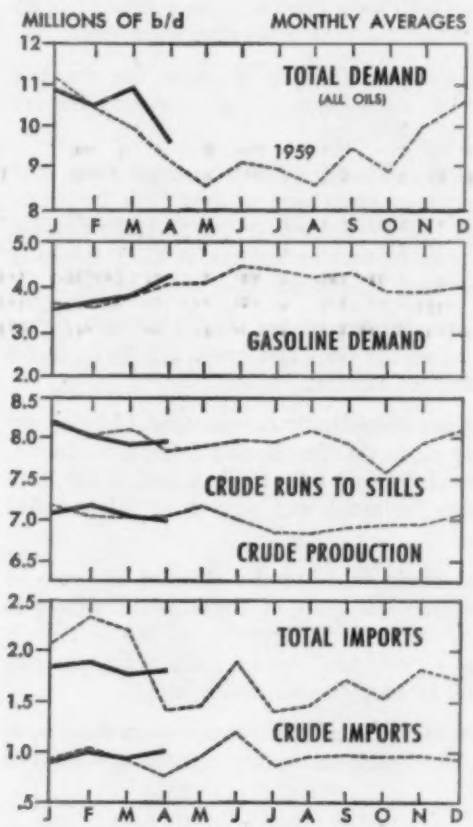
L. H. RALSTON is responsible for sales in the Dallas-Ft. Worth area and part of Oklahoma for Atlas Pipe, Inc., with offices in Houston. He has been associated with National Supply Co. and Sohio Petroleum Co.

J. S. (Buss) TAYRIEN has been named head of valve sales in the Permian Basin for Frank Wheatley Corp., with offices in Odessa, Tex. He was formerly district manager of the Oklahoma and Texas Panhandle area for another oil tool manufacturer. **Kenneth Sutton** has been named special sales representative for mechanical rubber goods and other fittings for Frank Wheatley. Sutton, formerly associated with Parkhurst-Sutton Sales Co., will be responsible for sales in northeastern Oklahoma. **Don R. Jepson** has been appointed head of sales for Wheatley-Taylor, Ltd., Calgary, a Frank Wheatley Pump & Valve Mfg. subsidiary. He was formerly with Devon-Palmer Oils, Ltd. **John Greeley,** a designer of secondary recovery equipment, has been named head of traveling sales promotion for Frank Wheatley Pump & Valve. **Orbie Sumner** is the new chief pilot and service manager, heading intercontinental service and engineering, for the pump and valve company. He was formerly a Wheatley Pump & Valve export representative in Caracas, Venezuela.

J. T. FURRY has joined Lathrop Diamond Bit Co., in Midland, Tex., as sales manager. For the past six years, Furry has been involved with diamond drilling and coring as sales engineer and sales manager for another oilfield service company.

PETROLEUM WEEK'S

Fingertip Figures



Figures for period ended May 13, except as noted

TOTAL DEMAND

Latest 4-week average	9.298
Year ago	9.010

GASOLINE DEMAND

Latest 4-week average	4.320
Year ago	4.189

RUNS TO STILLS

Latest week	8.034
Previous week	7.788
Year ago	7.684

CRUDE PRODUCTION

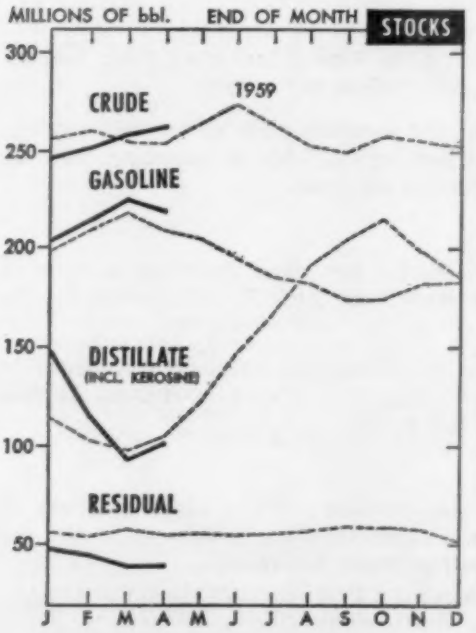
Latest week	6.794
Previous week	6.771
Year ago	7.178

TOTAL IMPORTS

Latest week	1.646
Previous week	1.672
Year ago	1.324

CRUDE IMPORTS

Latest week	1.014
Previous week	.953
Year ago	.904



CRUDE STOCKS

Week ended May 7	260.5
Previous week	262.7
Year ago	256.7

GASOLINE

Latest week	216.1
Previous week	218.8
Year ago	206.6

DISTILLATES

Latest week	107.9
Previous week	105.0
Year ago	112.1

RESIDUAL

Latest week	38.3
Previous week	38.7
Year ago	54.6

Refiners seem to be attracted to high runs like moths to a flame—and it can prove just as deadly for the industry.

Despite the high stocks, and the comments by a growing number of oil company executives that runs must be reduced, crude throughput last week was substantially beyond the industry-defined "safe" level.

Runs to stills last week climbed to 8,034,000 b/d, 246,000 b/d higher than the week before, and a hefty 350,000 b/d over a year ago.

Although all signs would point to a growing awareness of the problem among industry management, with many companies "announcing" fairly large cuts in throughput, these cuts are not being reflected in reduced over-all runs.

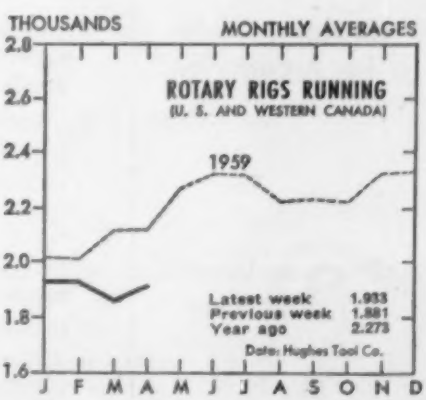
Unless throughput is kept at a much lower level, there is very little chance of avoiding unmanageable gasoline surpluses for the rest of the year.

To stress the point, April runs, averaging 7,955,000 b/d, were still too high to effect the hoped-for drawdown in gasoline stocks. And gasoline demand so far in May has been slightly lower than it was in April.

Until last week, refinery runs had averaged less than 8-million b/d for ten consecutive weeks—a major deterrent to a more rapid build-up in motor-fuel stocks.

But even with that reduced rate of runs —the reductions described by oil economists as essential—gasoline stocks were higher than necessary.

Prices for gasoline have reflected the surplus stock position—generally weak just at the time that gasoline demand is climbing toward its seasonal peak.



The Market Trend

It's Hard to Find a Spot Sale Nowadays

Straight-up sales were difficult to find this week. Four cargoes of residual fuel were booked on the West Coast (probably at a firm price of $1.90) for shipment to the East. Spot markets otherwise were dead.

But there's a lot of dickering going on that doesn't meet the eye. It's mostly jockeying for position with customers, trading against import quotas, looking for new lands to conquer.

Sellers looking for new business increasingly have to trade their way to a sale. Officials of Petroleos Mexicanos have been in New York trying to trade more bunker oil for gasoline. The French are trying to trade against their loans to the Far East for direct marketing outlets. A U. S. group is in Tokyo trying to talk away the rising tide of Russian crude in Japan.

Most of the deals nowadays are complex trades. An East Coast buyer picked up two cargoes of No. 2 fuel at the Gulf last week, and in so doing improved his position on crude import tickets.

And some of the transactions are exceedingly complicated. Here's one: A sells to B 500,000 bbl. of bunker oil in the Caribbean; B imports the oil, and A buys it back; A imports naphtha and sells to B. A and B are both pleased, for A was short on tickets for resid, and long on unfinished oils. B's position was just the reverse.

This type of trading market tends to mute the element of price in many transactions. Instead of cutting the price of Persian Gulf crude to meet competition, a seller does tricks with the gravity of the shipment. Or a Venezuelan seller can make a "cocktail" crude, adding (at his own expense) more naphthas or gas oil to keep the customer happy.

Today's market is being ruled by chemical engineers, cost accountants, and experts on foreign exchange. The rough-and-tumble trader of the 1950s is gone for good.

Build Now, Pay Later:

If you want a good shipyard deal, go to Japan. Last week three tankers were contracted for there on very lenient pay terms.

The buyer comes up with 2% of the purchase price at contract signing, 3% in the first year, 7.5% at keel laying, 7.5% at launching, 10% at delivery, and 70% over the following six years.

Naphtha Crude For Argentina:

Argentine Oilfields came in the market last week for three cargoes of naphthenic crude. Offers were made from the U.S. Gulf, Venezuela, the Persian Gulf, and Peru.

The winner probably will be Lobitos Oilfields, of Peru. Its price was 60¢ over Oklahoma/Kansas prices, f.o.b. Cabo Blanco or Talara. Lobitos won one cargo last month at this price.

Propane Lower This Year:

Hibbing, Minn., awarded its annual propane contract for 400,000 gal. to Western Oil & Fuel last week. Western's bid was 1.05¢ a gal. below the majority of prices in Oilgram for Group 3 shipment.

This price basis is lower than that of a year ago. At that time, Western Oil won at "0.75¢ off."

The Market Place AROUND THE WORLD

Prices compiled for PETROLEUM WEEK by Platt's OILGRAM Price Service and National Petroleum News, McGraw-Hill Publications

All prices as of May 16

Bold face type indicates changes from previous week

KEY PRICES—REFINED PRODUCTS

(¢ per gal. except dollars per bbl. where $ is shown)

Western Hemisphere

U.S. Gulf Coast, cargoes
- Gasoline, 98 oct prem....11.75-12.75
- Gasoline, 92 oct reg....10.75-11.5
- Kerosine....9-10
- Heating oil, No. 2....8-9
- Gas oil, 48-52 d.i....8.25-8.875
- Fuel oil, bunker "C"....$2.10-2.25

Caribbean, cargoes
- Avgas, Grade 100/130....14.75
- Gasoline, 93 oct research prem....11
- Gasoline, 87 oct research reg....10.125
- Gasoline, 79 oct research....9.375
- Gasoline, 70-72 oct motor method....9.25
- Kerosine....9.25
- Heating oil, No. 2....8
- Gas oil, 48-52 d.i....8.25
- Fuel oil, bunker "C"....$2.00

New York Harbor, barges
- Kerosine....9.8-10.3
- Heating oil, No. 2....8.8-9.3
- Fuel oil, No. 6....$2.47

Okla.-Group 3, northern shpt., bulk
- Gasoline, 91 oct reg....10.5-11.25
- Kerosine....9.125-9.625
- Heating oil, No. 2....7.75-8.25
- Fuel oil, No. 6....$1.50-1.70

Chicago, bulk
- Gasoline, 91 oct reg....11-11.5
- Heating oil, No. 2....8.5-10.35
- Fuel oil, No. 6 high sulfur....7.4

Los Angeles, rack
- Gasoline, 88 oct reg....11.65-12.65
- Diesel fuel, PS 200....7.75-11.25
- Light fuel, PS 300....$2.80
- Heavy fuel, PS 400....$2.15-2.35

Natural Gasoline, Grade 26-70
- FOB Group 3....4.5
- FOB Breckenridge, Tex....4

LP-Gas
- Propane, Oklahoma (Group 3)....3.5-4
- Propane, Baton Rouge....4.625-4.875

Pennsylvania Lubes
- **Bright stock, 25 p.t....24↑**
- 200 vis. neutral, 25 p.t....27

Mid-Continent Lubes, Tulsa basis
- **Bright stock, solvent, 95 v.i....26↑-27**
- **Neutral, solvent, 200-210 vis....23↑-24**

Gulf Coast Lubes
- Bright stock, solvent, 95 v.i....26
- Neutral, solvent, 200 vis....23

Eastern Hemisphere

Singapore (Pulau Bukom) cargoes
- Avgas, grade 100/130....15.875
- Gasoline, 79 oct research....9.75
- Kerosine....10.125
- Gas oil, 48 d.i. minimum....9.5

KEY PRICES–CRUDE OIL

(2¢ differential per deg. of grav. applies except as noted)

Western Hemisphere

United States (at the well)
- Mid-Continent, (Okla.-Kan.), 36.0-36.9....$2.62-2.97
- North Dakota, 36.0-36.9....2.47-2.87
- Texas:
  - Gulf Coast, low cold test, 26.0-26.9....3.50
  - Gulf Coast, Upper & Lower, 26.0-26.9....2.92-3.22
  - West Texas, sweet, 36.0-36.9....3.00
  - West Texas, N.M., inter., 36.0-36.9....2.93
  - West Texas, N.M., sour, 32.0-32.9....2.71
  - East Texas, flat....3.05-3.25
  - Mirando, 28.0-28.9....2.96-3.31
- Illinois Basin, flat....3.00
- Pennsylvania Grade, Bradford dist., flat....4.70
- California, Signal Hill, 21.0-21.9....2.32†
- North Louisiana-Arkansas, 36.0-36.9....2.72-3.02
- Wyoming, sweet, 36.0-36.9....2.85-2.90
- Wyoming, sour, 32.0-32.9....2.63-2.71

Canada (flat prices, at the well)
- Pembina (Alta.)....$2.38
- Leduc-Woodbend (Alta.)....2.53
- Redwater (Alta.)....2.42
- Steelman A (Sask.)....2.44
- Virden (Man.)....2.30

Venezuela (Cargoes, FOB lifting port designated)
- San Joaquin, 41.0-41.9, Puerto la Cruz....$3.10
- Oficina, 35.0-35.9, Puerto la Cruz....2.78-2.80
- Tia Juana, Medium, 26.0-26.9, Amuay....2.30
- Bachaquero, flat La Salina....1.85
- Tarra, 38.0-38.9, San Lorenzo....2.83
- Lagunillas Heavy, flat, La Salina....2.07

†Differential per deg. of grav. varies.

Eastern Hemisphere

Middle East, Persian Gulf (Cargoes, FOB lifting port)
- Arabia, 34.0-34.9, Ras Tanura....$1.90
- Safaniya, 27.0-27.9, Ras Tanura....1.50
- Iran, 34.0-34.9, Bandar Mashur....1.86
- Iran, 34.0-34.9, Abadan....1.81
- Iraq, 35.0-35.9, Fao....1.80
- Kuwait, 31.0-31.9, Mina-al-Ahmadi....1.67
- Qatar, 41.0-41.9, Umm Said....2.05
- Neutral Zone, Burghan, 23.5-24.4, Mina Saud....1.51
- N. Zone, Eocene-Ratawi, 20.5-21.4, Mina Saud....1.38

Middle East, Eastern Mediterranean
- Arabia, 34.0-34.9, Sidon....$2.27
- Iraq, 36.0-36.9, Tripoli, Banias....2.31

Far East, Cargoes FOB Lutong, Sarawak
- Seria Light, flat....$2.57

KEY TANKER RATES

(Last paid, per long ton, single voyage)

- **U.S. Gulf-New York, clean....(USMC—15%) $2.42↓**
- U.S. Gulf-New York, dirty....(USMC—10%) $2.57
- NWI-USNH, dirty....(USMC—55%) $1.24
- NWI-UK/Cont., dirty....(Scale—57½%) 13/11*
- Persian Gulf-UK/Cont., dirty....(Scale—67½%) 22/2*
- **Persian Gulf-USNH, dirty....(USMC—75%) $3.18↓**

**Sterling*

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DEPT/Personals

J. E. Swearingen

F. O. Prior

JOHN E. SWEARINGEN, president of Standard Oil Co. (Ind.), Chicago will become chief executive officer on Aug. 25, when **FRANK O. PRIOR** retires as chairman. The position of chairman will be eliminated.

HERBERT D. THORNTON becomes production manager, natural resources, for Union Carbide Olefins Co., New York, division of Union Carbide Corp., with responsibility for the exploration and development of natural gas. He joined Union Carbide in 1957 as a purchasing agent in the petroleum division of the general purchasing department. Before that he was Rocky Mountain division manager for McElroy Ranch Co.

DWIGHT H. SEELY, JR., is exploration manager at Sohio Petroleum Co.'s new Gulf Coast area office, at Houston. The former Gulf Coast division office has been eliminated, and district activities have been consolidated in the new office. The Gulf Coast area covers South Texas, East Texas, Louisiana, offshore, Mississippi, and Alabama exploration activities. **James H. Morris** has been appointed area geologist for Texas and offshore, and **Robert J. Field** area geologist for southern Louisiana. Morris was formerly Lafayette (La.) district exploration superintendent, and Field was staff assistant to the division exploration manager. **T. C. Danie,** district geologist for South Texas, and **W. L. Rader,** senior geologist for offshore, Louisiana, and Texas, will report to Morris. **A. J. Napier,** formerly Lafayette district geologist, now district geologist for southern Louisiana, will report to Field. **C. E. Storm,** formerly assistant division landman, is now landman in charge of all land activities in the Gulf Coast area; district land offices in the area will be maintained at Lafayette and New Orleans. **Jon Brook** will continue as landman at Lafayette, and **L. L. Fergus** will continue at New Orleans. **S. A. Hatcher,** formerly district geophysicist in New Orleans, becomes geophysicist for the Gulf Coast area. **C. F. Wendenburg** is in charge of the geophysical shop and field seismic crews. **S. W. Estes** is staff assistant to Seely.

JAMES C. REID is the new president of Southern Union Gas Co., Dallas, succeeding **Clare H. Zachry,** who is retiring. **Scott Hughes,** formerly first vice-president, succeeds Reid as executive vice-president. **J. R. Cole,** Santa Fe, N.M., formerly vice-president and operating manager, is now senior vice-president. **N. P. Chesnutt,** formerly chief engineer, succeeds Cole. **A. M. Wiederkehr,** formerly manager of the exploration department, becomes vice-president of gas supply and exploration. **Tom Corr,** Albuquerque, N.M., moves up from northwest division manager to northwest division vice-president; and **E. M. Kelley,** El Paso, Tex., from southwest division manager to southwest division vice-president. **B. F. Wombacker,** assistant treasurer, also becomes controller, and **A. S. Grenier,** assistant secretary and attorney, becomes general attorney and assistant secretary.

JAMES A. WILSON, vice-president of operations for the Texas distribution division of United Gas Corp., Houston, is the new president of the Southern Gas Assn. Other new officers of the association are: **H. A. Eddins,** president of Oklahoma Natural Gas Co., first vice-president; **C. L. Nairne,** vice-president of operations for New Orleans Public Service, Inc., second vice-president; **Willard G. Wiegel,** treasurer and vice-president of Lone Star Gas Co., treasurer; and **Frank Barragan, Jr.,** executive vice-president in charge of the commercial division of South Atlantic Gas Co., secretary.

R. W. McDowell

S. D. Breitweiser

R. W. McDOWELL has been elected chairman of Sunray Mid-Continent Oil Co., Tulsa, and **S. D. BREITWEISER** succeeds him as president of DX Sunray Oil Co., Tulsa, a subsidiary. McDowell, who has also been vice-chairman of the parent company, succeeds **C. H. Wright,** who was named chairman of Sunray Mid-Continent's finance committee. Breitweiser was formerly executive vice-president of DX Sunray. **Paul E. Taliaferro,** president of Sunray Mid-Continent, and Breitweiser now have chief executive responsibilities.

JOHN H. BARRY, JR., has been appointed assistant comptroller of Mobil Oil Co., with offices in New York. He will be responsible for financial analysis, consolidation and general accounting, and further development of the management information program. Barry joined the company in 1952 as an analyst in the methods research department. In 1958 he transferred to the economics department as an analyst, and became manager of the financial analysis department in 1959.

HAROLD S. SKINNER moves up to manager of public affairs and public relations for Continental Oil Co., Houston. He was formerly assistant to the president and director of public affairs. **John Post**, manager of industrial relations, was promoted to the newly created position of director of industrial and personnel relations. He will serve as special advisor to the president in those fields. At the same time, the name of the industrial relations department was changed to the personnel relations department. In Conoco's Rocky Mountain region land department at Denver, **Sam A. Brown, M. E. Thrash,** and **H. L. Dubusson** have been promoted to new positions. Brown, formerly Rocky Mountain region land superintendent, becomes regional coordinator of reserves and production acquisitions, and Thrash, formerly assistant regional land superintendent, succeeds Brown. Dubusson, contract man for the southern region in Houston, succeeds Thrash. **L. E. Graham, Hanes M. Dawson,** and **L. L. Dodds** have new assignments in the western region, at Los Angeles. Graham, formerly land superintendent for the western region, was promoted to the newly created position of special representative for the exploration department, and Dawson, formerly assistant land superintendent in the southwestern region at Ft. Worth, succeeds Graham as land superintendent at Los Angeles. Dodds, formerly assistant land superintendent at Los Angeles, has been named to the newly created position of regional title supervisor there.

H. S. Skinner

P. S. Magruder

P. S. MAGRUDER has been named assistant to the president of Mobil Oil Co., with offices in Los Angeles. He was executive vice-president of General Petroleum Corp. until that company merged with Mobil. In his new position, Magruder will be primarily concerned with the Pacific Coast area.

ROSE C. STEINHAUSER has been appointed assistant personnel manager of Texaco Inc., New York. Miss Steinhauser joined Texaco in 1943, and was most recently secretary to Texaco's chairman. In her new position, she will be responsible for personnel programs affecting women employees, including recruitment, training, and placement.

WILLIAM L. LOVING, vice-president of Cabot Carbon Co., Pampa, Tex., has been elected a vice-president of the parent company, Godfrey L. Cabot, Inc. He will move to Boston, where he will have charge of carbon black research and technical service as well as domestic production. Loving has been in charge of carbon black production in the Southwest for the subsidiary since 1955.

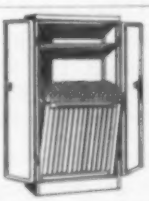
C. B. Marshall

J. W. Gwinn

CLIFFORD B. MARSHALL has been elected to the newly created position of executive vice-president of Standard-Vacuum Oil Co., White Plains, N. Y., and **J. W. GWINN** has been appointed manager of its exploration department. Marshall has been serving as vice-president, a director, and vice-chairman of the executive committee. He became a director in 1949, and last year gave up his marketing portfolio on the board of directors to devote more time to administrative matters and to supervise the company's employee policies and programs. Gwinn, with Stanvac since 1947, was most recently assistant manager of exploration at the company's headquarters office. Before that, he was exploration manager of the firm's producing and refining affiliate in Indonesia.

JOHN A. STORM, formerly assistant sales director of Sinclair Oil & Gas Co., Tulsa, has been promoted to sales director. He succeeds **A. T. Scherer**, who has elected early retirement under Sinclair's revised pension plan. Storm joined the Sinclair organization in 1940, and is a director of Sinclair Petrochemicals, Inc. **Bill Raney**, a member of the sales department staff, is the new assistant director, succeeding Storm.

G. W. BUTLER has been named coordinator of world-wide marketing activities for Standard Oil Co. (N.J.). He succeeds **M. W. Johnson**, who is now Latin American coordinator for Jersey. **E. F. Choppen**, formerly a director of Esso Petroleum Co., Ltd., succeeds Butler as Jersey's deputy coordinator for marketing.

MAP  FILE

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Profit: The Most Needed Product

PROFITS SHOULD BE A PRIME PRODUCT instead of an incidental or accidental byproduct, Jersey Standard's chief executive, Jack Rathbone, told refiners last week.

"We still seem to run our refineries as a tool to convert crude into products, with apparently no one really being responsible for determining whether all the products are needed or whether they can be sold for a profit," he said.

Further, he warned, refiners cannot afford to run a major segment of our industry as though it were some sort of proving ground for technical performance and bookkeeping agility. "We seem to be capable of making everything conceivable at a refinery except money," stressed Rathbone, who is also chairman of the American Petroleum Institute.

As the first step toward a restoration of the profit motive as the ultimate objective of petroleum processing, Rathbone suggested that refiners should study and gain a better understanding of oil economics. Then, he said, refiners must orient their thinking to the demand of the market.

REFINERS HAVE BEEN GUILTY of many wrongs, the Jersey Standard president pointed out. The operating emphasis, he charged, has been to stress volume, apparently with complete disregard for the economic impact of supply and demand, and to adopt wholly the "incremental throughput" philosophy as an operating standard.

Rathbone's remarks can well apply to the entire industry. The lure of incremental barrel, which he said has spread "like a virus," applies to all segments of the industry.

Domestic producers, for example, are guilty of the same type of wrong-doing charged to refiners when they over-drill an area just to accumulate additional allowable. Importers contract the incremental barrel virus when they continue to insist on higher allocations just to acquire an economic advantage of lower-priced raw materials. The press for additional gallonage by marketers—a direct result of the incremental barrel lure—is also a hard-to-cure virus.

"What is essential," Rathbone concluded, "is the determination to think and operate as businessmen." His remarks require more than a polite applause.

THEY ARE THE FOUNDATION for building a successful and healthy industry out of the survivors of the economic plague that has been prevalent for most of the postwar period.

NOW—ANOTHER DRILLING AID FROM MILWHITE

CHEK-LOSS

The Loss Circulation Product Whose Elasticity Gives You a Better Seal Under Pressure

. . . when compressed, conforms to the shape of the containing body and effects a more permanent, effective seal.

BEFORE PRESSURE

Photomicrograph of Chek-Loss under atmospheric conditions (note voids between particles).

UNDER PRESSURE

Photomicrograph of Chek-Loss when compressed (note the voids between particles have been decreased due to its elasticity).

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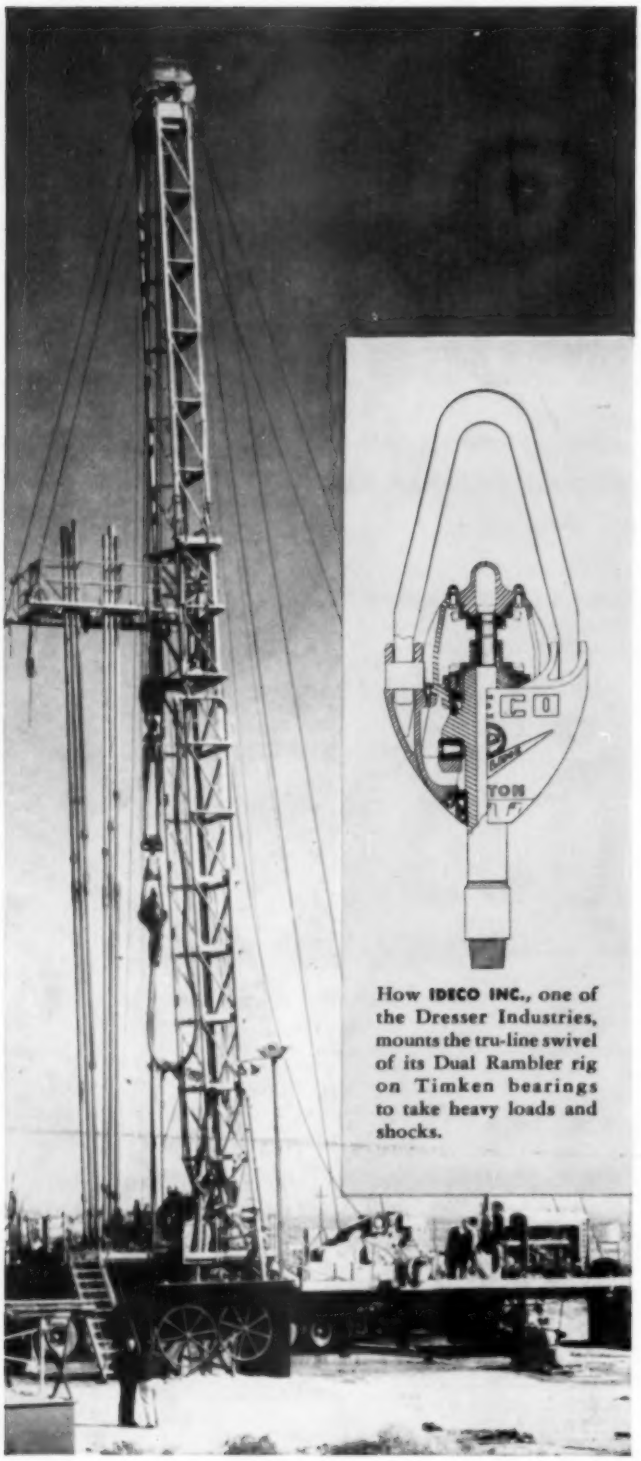

How **IDECO INC.**, one of the Dresser Industries, mounts the tru-line swivel of its Dual Rambler rig on Timken bearings to take heavy loads and shocks.

SETS UP FAST... fast on the job with Timken® bearings to eliminate breakdowns

IDECO'S Rambler Rigs combine the advantages of modern heavy-duty equipment with high mobility to provide faster, more economical operations. And to insure continuous, high speed operation under heavy loads and dirty operating conditions, Ideco specified Timken® tapered roller bearings at four critical load-carrying points—swivel, crown block, traveling block and rotary table.

Tapered construction lets Timken bearings take radial and thrust loads in all combinations. And with full line contact between Timken bearing rollers and races you get *extra* load-carrying capacity. By keeping shafts concentric with housings, Timken bearings make closures more effective in keeping lubricant in, keeping dirt and dust out.

And Timken bearings practically eliminate friction—reduce wear on related parts, prolong life. They're geometrically designed to give *true rolling motion,* precision-made to do just that in actual daily service. We even make our own steel—something no other American bearing maker does.

Insist on Timken bearing quality, as Ideco has done for years. When you build or buy machinery for the petroleum industry, look for the trademark "TIMKEN" on every bearing. It's your symbol of Better-ness. ***When you buy Timken bearings you get...*** *1) Quality you can take for granted. 2) Service you can't get anywhere else. 3) The best-known name in bearings. 4) The pace setter in lower bearing costs.* The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable: "TIMROSCO".

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